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**HOSPITAL PROSPECTIVE REIMBURSEMENT
IN NORTH AMERICA: AN EVALUATION
OF ITS EXPERIENCES TO CONTAIN COSTS**

ROBIN G. MILNE

MAY 1984

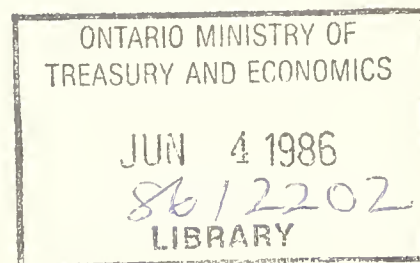


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I was provided with several opportunities to learn how hospitals were paid in Ontario. These involved free access to the files of the Ministry of Health, particularly those on hospital budgets and on the incentive award scheme in operation between 1970 and 1973. They also involved interviews with officials from the Ministry of Health and elsewhere, a list of whom is given in Appendix B. Among that list, Bill Clark, one-time chairman of the Budgets Committee, deserves mention for the special relevance of his experience and the generous way he made it available.

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PART I

INTRODUCTION

Prospective reimbursement involves a way of payment that should be contrasted with retrospective reimbursement. In Part I of this study we put prospective reimbursement in context. In the past, hospitals were invariably reimbursed retrospectively, in both America and Canada. The change to prospective reimbursement was one response to the growth in hospital expenditure. This growth and the various sources of its finance are indicated in Chapter 1.

The rapid growth and large size of hospital expenditure has brought about a number of responses apart from prospective reimbursement, especially from those responsible for its finance. In America four such responses can be identified which have involved the federal government, amongst others. These responses are briefly described, and evaluations for their impact on hospital costs are briefly summarized. Their appropriateness for the Canadian situation is also reviewed.

Finally, after reviewing the context of prospective reimbursement, we explore some of the theoretical issues involved in evaluating its impact on hospital costs. Common principles are involved in evaluating different schemes and these are identified. Also, we draw on the experience of quite different jurisdictions, and conclusions from one may not apply to others without qualification. We examine whether this has been the case between America and Canada.

Trends in hospital expenditure in America and Canada

One can hardly be unaware that expenditure in the health services in general and hospital care in particular has increased many-fold over the last few decades. But so also have many other financial indicators, particularly prices. More significantly, the allocation of GNP to hospital care has also increased on a non-trivial scale. In America it increased from 1.5 per cent for all hospitals in 1955 to 3.8 per cent in 1980. In Canada it increased from 1.2 per cent to 3.0 per cent for public, non-federal general and allied special hospitals over the same period.¹ This North American experience would seem to be typical of other developed economies (OECD, 1977, 33-5).

In Table 1.1 the increases in hospital recurrent expenditure² are broken down into their several constituents over five-year intervals for America and Canada. The experiences of these two jurisdictions are much the same. Matching the increase in total expenditure have been increases in the respective populations and patient-days per capita. But the substantial increase for all five-year intervals has been of per diem costs. Data on increases in the consumer price index (CPI) are given for comparison.

It is not easy to separate the respective contributions of price (and wage) inflation and service volume increases as contributors to per diem cost inflation. Careful analysis does not support the conclusion that price inflation had a subsidiary role, as the straight comparisons of changes in per diem costs and the CPI in Table 1.1 might suggest. Wages of hospital employees rose faster than in the economy as a whole both in America (Fuchs, 1976) and in Canada (Barer and Evans, 1983) even, as is shown for America, when account is taken of the personal characteristics of the

TABLE 1.1

Changes in hospital expenditure and its several components, America and Canada, 1950-1980 (percentage)

	Expenditure	Population	Patient-days per capita	Per diem costs	Consumer price index
<u>America</u>					
(non-federal, short-term, general, and special hospitals)					
1950-55	58.9	8.9	0.3	48.0	11.2
1955-60 ^a	67.4	8.9	8.0	39.4	10.6
1960-65	62.4	7.5	9.4	38.0	6.5
1965-70	114.5	5.6	11.5	82.1	23.1
1970-75	99.0	5.3	1.4	86.4	38.6
1975-80	N.K.	5.4	4.2	N.K.	53.1
<u>Canada</u>					
(Public, non-federal, general, and allied special hospitals)					
1950-55	116.3	14.5	10.4	71.1	13.2
1955-60	83.8	13.8	7.4	51.7	10.0
1960-65	79.7	9.9	8.2	49.7	8.4
1965-70	102.0	8.4	5.7	76.2	20.8
1970-75	110.1	7.2	0.4	96.1	42.5
1975-80	86.7	5.2	5.3	68.0	52.0
N.K. = not known					

a Alaska and Hawaii joined the United States series in 1959.

SOURCE: American data are taken from United States, Statistical Abstract of the United States (annual). Canadian data are taken primarily from Barer and Evans (1983) Tables 4, 11, and 12, supplemented by Statistics Canada, Canadian Statistical Review (various months).

labour force such as age, sex, colour, and education (Fuchs, 1976).

Altman (1975), Feldstein (1971a, chapter 2) and Fuchs (1976) give estimates of the respective contributions of price (and wage) and volume increases in America from the early 1950s to the early 1970s. All indicate that both contributions were important. Estimates by Altman and Feldstein give changes in input prices and service volume per diem about equal importance. Barer and Evans (1983), in a thorough analysis of expenditure trends at public, non-federal, general, and allied special hospitals, indicate that in 1980 the consumer price index was 3.52 times its level in 1950. The corresponding estimates for the prices of hospital inputs and per diem costs (expenditure) are 10.39 and 22.57. The three corresponding annual average cumulative rates of increase are approximately 4 per cent, 8 per cent, and 11 per cent, respectively. Thus, inflation in the hospital sector was about twice that for the economy as a whole, and

accounted for between two-thirds and three-quarters of the increase in per diem costs.

The finance of hospital expenditure in America and Canada

Feldstein (1977) shows evidence, and is firmly convinced, that the major reason for the increase in per diem costs in America, relative to the consumer price index between 1966 and 1975, was the growth in voluntary insurance and the public insurance provided through Medicare. Evans (1976, 451-462) is more skeptical of this source as a major cause of the increase in Canada, particularly in respect of the federal-provincial scheme introduced province-by-province between 1958 and 1961. He has suggested, instead, that this public scheme was more probably a response to the rapid increase in hospital expenditure that had already occurred, possibly in part due to the growth of voluntary insurance (Evans 1976, 462). Whichever view is correct, there is some point in identifying the various sources of hospital finance. This is given in Tables 1.2 and 1.3 and relates to the finance of recurrent expenditure for select years. The American experience is outlined first.

A major source of hospital finance in America in 1950 was direct charges to patients (Table 1.2). It accounted for some one-third of hospital income. Private (voluntary) insurance was not unimportant, but it had hardly developed then as the private sector's main method of paying its share of hospital costs. Public finance, on the other hand, was most important, and accounted for nearly one-half of hospital income. State and local governments contributed more than the federal government at that time. Philanthropy was a minor source of hospital income taking the hospital sector as a whole.

An examination of the table indicates some change in the distribution of sources will be evident over the next thirty years. Patient charges and philanthropy have decreased in (relative) importance. Over the long term, their decline has been continuous, although year-to-year fluctuations during the 1970s have masked the trend to some extent (Gibson and Waldo 1981, Table 5). In the period up to 1965 the growth of voluntary insurance was responsible for these trends and for the decline in the importance of the public sector. With the implementation of the federally legislated Medicare and Medicaid programs in 1966 the public sector increased in importance and, by 1980, contributed more than one-half of hospital

TABLE 1.2
Sources of hospital finance (America), selected years (%)

Source	1950	1965	1980
Patient charges	33.4	17.2	9.1
Third party			
Voluntary insurance	17.7	41.8	35.2
Federal government expenditure	19.0	17.5	41.5
State and local government expenditure	26.3	21.3	13.0
Philanthropy	3.5 ¹	2.2	1.2
All sources	100.0	100.0	100.0

SOURCES: Reed and Hanft (1966) Tables 1 and 10; Gibson and Waldo (1981) Table 6.

1 On the basis of estimates for later years, this residual item should be wholly attributed to philanthropy.

TABLE 1.3
Sources of hospital finance (Canada), select years (%)

Source	1953	1957	1961
Patient and other revenues ¹	29.0	23.7	6.6
Third party			
Voluntary insurance	15.5	19.9	5.3
Public insurance	11.5	11.7	61.1
Workmen's compensation	1.8	1.8	1.8
Government grants	39.0	38.3	24.5
Deficits of active treatment hospitals ²	3.3	4.4	0.6
All sources	100.0	100.0	100.0

SOURCE: Canada (1964) Table 11.20.

1 Includes donations, contributed services, investment income, and net income from ancillary services.

2 Largely but not wholly financed by the public sector at a later date.

income. Private insurance lost some of its importance, but has remained the vital source of private finance. By 1980 less than one-tenth of hospital income came from patient charges.

Medicare and Medicaid also constitute the major public programs to finance hospital care in America.³ In 1980 they contributed 66 per cent of all public expenditure. Net expenditures on state and local hospitals contributed 11 per cent. Expenditures on Workers' Compensation, on veterans, and by the Defence Department were 4 per cent, 9 per cent, and 6 per cent, respectively (Gibson and Waldo, 1981, Table 7a). Public measures to contain hospital costs may, therefore, give the Medicare and Medicaid program a central role, and knowledge of these two programs would help show how and in what way this might happen.

Medicare is a federal program that was implemented on July 1, 1966 for the elderly, i.e., those aged 65 and over, and extended on July 1, 1973 to the permanently disabled. Medicare comprises two parts, A and B. Part A refers to in-patient care and involves mandatory contributions up to the time beneficiaries become eligible by way of age or disability. Thereafter, no premiums are required to be insured against hospital costs, but patients have to pay part of the cost of hospitalization. Those deemed unable to do so would have their share of the cost of hospitalization covered by Medicaid. Payment is a fixed deductible plus a daily charge for patients staying on more than sixty days. In 1981 the deductible was \$204, and the daily co-payment charge was \$51 for the next thirty days. Patients have had a 'lifetime reserve' of sixty days for stays beyond this length within a defined period, but once exhausted, they may not be reused. This daily co-payment was \$102 in 1981. Thereafter, patients had to pay the full cost of their care. On average, the per diem cost of treating Medicare patients in 1981 was \$342 (SSB, ASS, 1981, 24 and Table 138). In 1966, the patients' share had been 30.3 per cent. This proportion fell to a minimum of 29.7 per cent in 1968. Since then it has risen continuously to 31.8 per cent in 1981.

Medicare patients have had, of course, the option of taking out supplementary private insurance to cover the deductible and their share of co-insurance. In 1975, 62.7 per cent of those aged 65 and over had voluntary insurance to cover hospital care and rather smaller proportions for various types of physician services⁴ (Mueller, 1977). In addition, a significant proportion of the elderly has been covered by Medicaid and would have no out-of-pocket expenses anyway. Some 17 per cent would

seem to have been covered this way in 1975 (Mueller, 1977, 4). In 1977, public sources financed 88.2 per cent of hospital care used by the elderly, and voluntary insurance covered a further 5.7 per cent. Direct payments by the elderly were only 4.8 per cent. There was a residual 'other', presumably from private philanthropy, of 1.3 per cent (Gibson and Fisher, 1979, Table 5).⁵

Medicaid is a federal-state cost sharing program for the 'medically indigent'. It was also implemented in 1966. State participation is voluntary, but by 1970 all but two states participated in it. Since 1973 only one, Arizona, has still failed to do so. The federal share of public expenditure on Medicaid varies by state, depending on the latter's per capita income. In 1981 the proportion varied from 50 per cent to 78 per cent (SSB, ASS, 1981, 35).

Two groups eligible for Medicaid should be distinguished. The first comprises those in receipt of cash payments from either the program of aid to families with dependent children (AFDC) or the supplemental security income (SSI) program for the aged, blind, and disabled. This group is generally automatically covered for the cost of hospitalization and it is not permissible to charge them for such short-term care as they receive. The second group is comprised of the 'medically needy', that is, 'persons covered under one of the cash welfare programs (aged, blind, or disabled individuals or members of those families with dependent children having one parent absent, incapacitated, or unemployed) who have enough income to meet their basic living expenses (and so are not recipients of welfare) but do not have enough to pay for their medical care' (SSB, ASS, 1981, 35). The second group qualify as much because of exceptionally heavy medical expenses as because of the lack of resources. States may stipulate the conditions of eligibility for the second group. It has been suggested that some 35 per cent of those below the 'poverty' level were not eligible (Davis and Reynolds, 1976, 394). Since 1973, states have been allowed to charge the 'medically needy' for part of the cost of short-stay hospitalization.

The earliest year for which sufficiently detailed information on Canada is available is 1953. The provinces have had a long history of financing virtually the whole cost of psychiatric hospitals and tuberculosis sanatoriums (Kohn, 1972, 148). Post-war developments focused on the growth of voluntary insurance and its replacement by public programs to finance the cost of care at active treatment and allied specialist hospitals. These

hospitals correspond fairly closely to what, in America, are described as short-term general hospitals. The pattern in Canada, therefore, closely resembles that described above for America. By 1953, four of the ten provinces already had public insurance schemes of their own: Saskatchewan, British Columbia, Alberta, and Newfoundland. Coverage by the first two was virtually universal. The latter two covered some one-half and three-quarters of their respective populations (Taylor, 1978, 170).

In 1957, the federal government passed the Hospital Insurance and Diagnostic Service Act (HIDSA). This introduced a federal-provincial cost-sharing scheme to cover in-patient care and such out-patient services as the provinces elected to include. Not all forms of institutional care were covered. Tuberculosis sanatoriums, psychiatric hospitals, nursing homes, and homes for the aged were explicitly included. But psychiatric care, if provided within a participating hospital, was included, as was long-term chronic care. Nor were all hospital expenditures allowable. The capital cost associated with interest payments and depreciation were explicitly excluded, and coverage was limited to standard ward costs. To ensure universal coverage within participating provinces, private insurance was no longer allowed to compete with the federal scheme. Private schemes were limited to covering expenditures over and above standard ward costs. The effect has been to give the federal-provincial scheme a virtual monopoly over the insurance of hospital costs. Newfoundland, Manitoba, Saskatchewan, Alberta, and British Columbia participated from its beginning on July 1, 1958. Nova Scotia, New Brunswick, and Ontario joined next on January 1, 1959. Prince Edward Island joined on October 1, 1959, the North West Territories on April 1, 1960, the Yukon on July 1, 1960, and Quebec, last of all, on January 1, 1961 (Soderstrom, 1978, Table 2).

Very much as for the Medicaid program in America, participation by the provinces in HIDSA has been voluntary. This largely reflects the constitutional rights of the provinces in the sphere of health services. Provinces have also had some discretion in the way HIDSA is implemented. However, participating provinces are required to make the insured services available to all residents - not only from their own province but to residents from other provinces participating in HIDSA - on uniform terms and conditions. This has limited the ability of provinces to set premiums as a condition for participation in their provincial hospital insurance plan, and to charge patients for the use of hospital services. Further deterrents to imposing patient charges, but not to setting premiums, were the require-

ments to obtain prior approval by the federal Governor-in-Council and to share such revenue as was obtained with the federal government. Both these disincentives to set charges disappeared on April 1, 1977.

Since 1977, it has become common for provincial governments to set authorized charges for some or other type of in-patient care, even though they could infringe upon the federal requirement of uniform terms and conditions that makes them eligible for HIDA. Actual practice has tended to change from year to year. For example, the charges imposed in New Brunswick in 1979 have since been abandoned (S.C., 1981a, 173; and Mennie, 1983a). Nevertheless, two of the provinces (Prince Edward Island and Nova Scotia) and the two territories have so far resisted setting charges. In addition, at least three common features can be identified among the eight provinces whose governments have made charges for in-patient care.

First, a distinction has been made between short-term patient care and long-term patients when deciding to set authorized charges and in choosing the level set. Second, when patients must pay, the level of charges has been very low compared to the cost of care provided. And third, certain specified groups have been exempt from even these low charges.

The following examples illustrate each of these three common features. They all refer to practice as at September 1979 (S.C., 1981a, 172-9). First, Ontario had no charges for short-term care, but per diem charges (of \$10.05) were set after 60 days for chronic, rehabilitative, and convalescent care in hospitals and designated nursing homes. Second, Newfoundland had per diem charges of \$3, limited to a maximum of fifteen days, for care at general and allied special hospitals. Neither Ontario's charges for long-term patients nor Newfoundland's for short-term care bore comparison with the per diem costs of more than \$160 at public general hospitals at that time (Barer and Evans, 1983, Table 12). And finally, typical of those exempt from authorized charges were those aged 65 and over in Alberta, and the newborn and organ donors in British Columbia.

Until March 31, 1977, the federal share in each province's expenditures on hospital costs was determined by the province's and national per capita expenditures on the insured services. Thus, in 1971 the share varied from 47 per cent in Quebec to 60 per cent in Newfoundland (Taylor, 1978, Table 16). With the passage of the Federal-Provincial

Fiscal Arrangements and the Established Programs Financing Act of 1977, the formula to determine the federal government's share changed. It is no longer based on current expenditure, but on an historic base whose rate of increase is adjusted with changes in per capita GNP (Soderstrom, 1978, 139-42).

The above developments are reflected in Table 1.3. Only one further point related to this table must be made. It is apparent that deficits at hospitals providing active treatment had practically disappeared on the implementation of HDSA by all the provinces. Up to that time, deficits had become progressively more important. In 1948, deficits at these hospitals were only 1.0 per cent of expenditure by all hospitals (not shown). By 1957, the proportion had risen to 4.4 per cent. The provincial hospital associations had good reason to welcome HDSA.

A variety of factors apart from the extension of the third party finance of in-patient care have influenced hospital expenditure. In the present context of public policy towards containing hospital costs, we limit our discussion of these other factors to the third-party finance of hospital out-patient services, physician services, and capital expenditure. The first two obviously influence hospital recurrent expenditure. The finance of capital expenditure can do so too, directly through the burden of interest charges and depreciation that comes from borrowing. But capital expenditure can also influence recurrent expenditure regardless of its source of finance, because it provides the beds and facilities that permit hospital activity to increase. Staff are another ingredient that influences hospital activity and hence recurrent expenditure, and some believe that controls on them might provide the real key, over the long term, to hospital and health services cost containment (Evans, 1982, 385-6). Nevertheless, measures of influence for supply of staff through the support of medical and nursing education are not discussed in this study.

Ambulatory care, either at an out-patient clinic or at a physician's office, can influence expenditure on hospital services in one of three ways. First, it can be a substitute for in-patient care, evidence of which is found in Davis and Russel (1972) and Newhouse and Phelps (1976). Second, part of the growth in hospital costs is due to out-patient activity, even though this development has not been the dominant influence on total hospital expenditure. And third, hospitalization usually involves physicians' services whose cost is not fully covered by hospital insurance. The finance of physician's services, therefore, can influence the demand for

hospital care.

Gibson and Waldo (1981) make no distinction between hospital income from in- and out-patient care in America. The data in Table 1.2 refer to both activities. Data on physicians' services are, however, available. In 1980 patients' charges contributed 37.3 per cent of physicians' income, voluntary insurance 36.3 per cent, and public finance 26.4 per cent (Gibson and Waldo, 1981, Tables 6a and 7a). Thus, public sector finance is much less important for physicians' services than for hospital care. On the other hand, Medicare and Medicaid's share within the public sector was much more important, being 81.3 per cent of the whole. Workers Compensation financed 13.0 per cent of the public sector's contribution. The remainder of this discussion on the American situation therefore concentrates upon the roles of Medicare and Medicaid as sources of the finance of hospital out-patient and physician services.

Medicare, as mentioned above, comprises two parts, A and B. Part A is a mandatory scheme covering in-patient care. Part B is a voluntary scheme covering out-patient and physician services, referred to as Supplementary Medical Insurance. Eligibility for Part A depends on a given level of contributions being satisfied prior to reaching the age or disability qualification. Eligibility for Part B, on the other hand, depends on the current payment of a monthly premium. In 1980 it was set at \$11. In common with hospital in-patient care, patients must share in the cost of out-patient and physicians' services. In 1980 there was an annual deductible of \$60 and the co-insurance rate for additional allowable costs was set at 20 per cent. Davis and Reynolds (1975, 362) refer to allowable costs as 'those considered customary and usual for a given service in a particular area'. About 56 per cent of physicians in 1972 did not exceed this limit (Davis and Reynolds, 1976, 409). Patients have to pay the full additional amount for the remainder that do so. In 1980 Medicare covered 77.7 per cent of the allowable costs of physicians' care for the elderly, and 71.2 per cent of total charges for hospital out-patient services for this group. The corresponding proportions for the disabled are 78.6 per cent and 75.0 per cent respectively (SSB, ASS, 1981, Table 140).

Few comments on the finance of hospital out-patient and physician services through Medicaid are necessary. The conditions for eligibility are identical for these services as for in-patient care, and are as described above.

Unlike America, the federal government's program in Canada for

financing physicians' services and, to some extent, hospital out-patient services, did not develop along with hospital in-patient services. Thus in 1961, when HIDSAs were fully operational throughout Canada for the first time, public finance accounted for 87.8 per cent of hospital income; voluntary insurance covered 5.3 per cent; and patient charges and non-deductible income covered 6.6 per cent (Canada, 1964, Table 11.20). In the same year, public funds for physicians' services contributed only 12.4 per cent; voluntary insurance covered 43.6 per cent; and patient charges were 44.1 per cent (Canada, 1964, Table 11.21).

The original intention of HIDSAs was that the provinces should include out- with in-patient services in their hospital plans as insured services, and it was agreed that both should be subject to a similar federal-provincial cost-sharing formula (Soderstrom, 1978, Table 4.6). However, out-patient services tended not to be included in the provincial hospital insurance plans when they were first introduced, due to opposition from the medical profession (Taylor, 1978, 235). This opposition has since been withdrawn, with the passage of the Medical Care Act of 1966, a federal-provincial program that insures physicians' services. In September 1979 only two provinces imposed out-patient charges. In New Brunswick they were set at \$6 for those under 65 years, and \$2.65 for those older. Charges were waived for those on social aid and for others in some specified disease groups. These charges were withdrawn after a few months experience, but have since been reintroduced. In September 1979 in British Columbia the charges were set at \$2 for emergencies, day care, and minor surgery, and \$1 for other designated services. Charges were also made for in-patient care in both these provinces (S.C., 1981, 172-9; and Mennie 1983a).

Federal legislation to cover physicians' services within a public insurance scheme was implemented through the Medical Care Act of 1966. Unlike HIDSAs, the federal government's contribution did not depend on expenditure at the individual provincial level, but on expenditure at the national level (Soderstrom, 1978, Table 4.6). Like HIDSAs, the basis for determining the federal contribution changed on April 1, 1977. Increases depended on increases in GNP, not on expenditure. Like HIDSAs, provincial participation in the Medical Care Act has been voluntary. The program began July 1, 1966, and by April 1, 1972, all provinces and territories were participants.

Provinces are allowed to charge patients for physicians' services, but

not so as to 'impede...reasonable access'. Saskatchewan introduced, in 1968, a co-payment charge for physicians' services of \$1.50 for an office visit and \$2.00 for a home, emergency, or hospital out-patient visit (Beck, 1974, 131). The charges proved politically unpopular and were removed in 1971 with the change of government (Evans, 1976, fn.10). In September 1979, no provincial governments required patients to pay for physicians' services. Provinces have varied in their acceptance physicians imposing charges of their own, known locally as 'extra billing'. The provinces of Alberta and Nova Scotia represent one extreme. They permit physicians to charge the provincial government and patients for the same service. The province of Quebec represents the other extreme. In Quebec a twofold distinction is made, of which the more important for present purposes is between physicians who 'participate' in its health insurance plan and those who do not. The former must accept the plan's rates of reimbursement whether they are paid directly by the plan, or indirectly (opted-out) by the patient. Non-participants may charge patients what they choose, but neither they nor their patients are reimbursed by the plan. The only exception is when patients require emergency services which are reimbursed at the plan's rates. In all, some 10 to 15 per cent of fee practice physicians in Canada extra bill, and the revenue they obtain this way is estimated in 1980 to be some 2 per cent of total provincial payments for insured services (Mennie, 1982b).

The events described above for America and Canada show contrasting experiences in the development of public programs to finance health services. In America, the emphasis has been to cover a range of services which is far more comprehensive than the above description shows, but available to a far more restricted section of the population. In Canada the emphasis has been universal coverage for select services. There is no doubt, however, that though the balance is different, the public sector has played a far larger role in the finance of health services in Canada than in America (OECD, 1977, Table 1).

We turn finally to the finance of capital expenditure. This can come either internally from the hospital's own reserves, or externally through borrowing, philanthropy, or government grants. America and Canada share a common development in the respective contributions of these sources, at least until comparatively recently. At first, philanthropy had a dominant role. Its importance was displaced with the introduction of federal government finance shortly after the Second World War. Concern

that the hospital sector may have grown too large then led to a reduction in government support; and, in America at least, borrowing has taken its place.

In America, the federal government initiative came via the Hospital Survey and Construction Act of 1946 (PL 79-725 and more commonly known as the Hill-Burton program). The act's original aim was to increase the supply of beds in rural areas and other areas with perceived bed shortages. Amendments in 1954 (PL 83-483) and 1964 (PL 88-443) included the development of more out-patient facilities and the modernization of existing facilities. The federal government gave grants of from one-third to two-thirds of the project's total cost, the actual proportion being larger in states whose per capita income was lower. A further amendment in 1970 (PL 91-296) raised the federal government's grant to 90 per cent for facilities serving people in very poor areas or if the project promised to reduce operating costs substantially. At the same time the federal government offered interest relief and also to act as guarantor for loans taken out (Lave and Lave, 1974, 7-12). The Hill-Burton program was superseded by the Health Planning and Resources Development Act (PL 93-641). Federal (and state) government support has continued through the reimbursement of hospital costs by Medicare and Medicaid for their shares of the capital costs associated with interest payments and depreciation.

Prior to Medicare and Medicaid federal support for capital expenditure was, nevertheless, limited. Not all hospitals were eligible and, of course, only a fraction of eligible costs was covered. Thus in 1962, 13.9 per cent of the cost of all construction was covered by the Hill-Burton program, and the proportion of eligible projects was 38.6 per cent (Lave and Lave, 1974, Table 5). Surveys at that time inevitably indicate differential experiences (Stambaugh, 1967; and Ginsburg, 1972). Thus, Catholic short-term community hospitals received proportionately less in the way of public grants from all sources than other private non-profit hospitals. Catholic hospitals instead relied more on internal finance and borrowing. Predictably, (non-federal) government hospitals had far greater access to public funds from all sources, including the Hill-Burton program, than private hospitals, and relied less on borrowing. The government hospitals had practically no access to private donations. Finally, specialty hospitals were far more successful than general hospitals in raising funds from philanthropy, therefore relied less on public grants or borrowing.

Public finance of the construction of medical facilities, including

hospitals, has been a major responsibility of state and local government as well as the federal government. However, such funds as state and local governments provided, in contrast to the federal Hill-Burton program, were largely restricted to their own hospitals (Reed and Hanft, 1966, 10).

Nowadays, hospitals in America rely principally on borrowing to finance capital expenditure, and other sources, including government grants, play a subordinate role. Thus in 1975, borrowing financed 56.8 per cent of all capital expenditure begun that year, government grants 22.9 per cent, philanthropy 8.8 per cent, and hospital reserves 11.6 per cent (Manley and Ashby, 1977, Table 1). The present dominance of borrowing can be traced to the early 1960s (Ginsburg, 1972, Table 4). In a survey of private non-profit hospitals, the proportion financed this way increased from 17.5 per cent in 1962 to 23.3 per cent in 1966. The trend was most strong in lay-controlled hospitals, where the corresponding proportions are 11.9 per cent and 22.3 per cent and where most of the funds came from commercial sources. Undoubtedly, the hospital's ability to borrow reflects reimbursement policy then and now. Cost reimbursement schemes run by third parties, especially through Medicare and Medicaid, cover a major part of capital costs through the payment of interest charges and depreciation. Philanthropy and direct charges to patients or to commercial insurance companies can probably fill the gap left, if past experience is anything to go by.

Canadian experience matches that of the American Hill-Burton program. At the federal level, the Hospital Construction Grant was put into operation on April 1, 1948, as part of the National Health Grant Program. Projects required federal approval. Unlike the Hill-Burton program, the Canadian scheme required the provincial governments to match the federal government's grants. The level of the federal grant was initially set at limits of \$1,000 per active treatment bed and \$1,500 per chronic bed, or one-third of their actual costs, whichever was the smaller. On January 1, 1958, the absolute limits were varied to \$2,000 per bed without distinction between active treatment and chronic care (Hanson, 1963, 41). The Hospital Construction Grant was terminated on March 31, 1970. No further federal programs to provide grants for the construction of patient care facilities have since been introduced.

Provincial and municipal governments have been free to provide such financial support as they choose, subject to satisfying the conditions of the federal Hospital Construction Grant when it was in operation. Several

provincial governments made only the minimum contribution; others contributed a larger proportion. Nevertheless, with the apparent exceptions of New Brunswick and Newfoundland, public funds from all sources were not sufficient to cover all the capital costs of projects at non-teaching hospitals (McCracken, 1961, Appendix 1; and Piercey, 1971, 47).

Canada's experience of federal support for capital expenditure departs from America's when it comes to their respective federal government's finance of recurrent expenditure. Canada's HDSA explicitly excluded interest payments and depreciation as allowable cost if the capital expenditure involved land, buildings, and physical assets. Only depreciation on moveable, specific hospital equipment such as for radiology was allowable. What hospitals were unable to finance from public grants therefore had to come from private donations, or from charges for services not covered by HDSA such as for private and semi-private accommodation. The passage of the Federal-Provincial Fiscal Arrangements and the Established Programs Financing Act of 1977 has done little to change this situation. Provincial governments have block grants from the federal government, and they can continue to make their own arrangements for reimbursing interest charges and depreciation. Access to public funds to finance capital expenditure is now definitely more difficult in Canada than in the past. In contrast, the extension of the federal programs in America to cover the elderly and poor has probably made access more easy, even if it is now indirect.

This concludes our description of the finance of hospital in- and out-patient care, physicians' services, and hospital capital expenditure in America and Canada.

Summary

In America and Canada there has been a substantial growth in hospital expenditure over the post-war period which has more than outmatched the increase in population and GNP. Part of this growth can be attributed to the more rapid increase in wages in the hospital sector than elsewhere. But a substantial increase in real terms has also occurred.

Matching the increase in hospital usage and the employment of resources has been a period of growing public finance of hospital recurrent and capital expenditure and of physicians' services. Public finance has now put voluntary insurance in the shade in America and totally eclipsed it in Canada. Hospital expenditure is now a real financial burden

for the public sector, and various initiatives have been made in both jurisdictions to contain its further growth. The latter are the subject of discussion in the next chapter.

NOTES

- 1 Public, non-federal general and allied special hospitals have accounted for the overwhelming proportion of hospital provision in Canada. As at March 31, 1980, they accounted for 96 per cent of all beds (S.C. 1982, Table 1).

The American data are taken from Gibson and Waldo (1981). The Canadian data on hospital expenditure came from Barer and Evans (1983) Table 12, and on GNP from Statistics Canada (1972) and a recent issue of Statistics Canada, Canadian Statistical Review (monthly).

- 2 It should be noted in this context that hospital costs include non-in-patient activities. Evans (1976, 454-6) argues persuasively that, at least for the period he covers, the approximation of in-patient activities for all activities does not seriously qualify his conclusions. A similar view also seems reasonable for the American counterparts, for the period 1966-79 (A.H.A., 1980, Table 1).
- 3 This description of the Medicare and Medicaid programs draws heavily from S.S.B., A.S.S. (1981) 9, 23 and 35-7, and Davis and Reynolds (1975 and 1976).
- 4 For example, some 42.8 per cent of the elderly were covered for physician in-patient visits.
- 5 The corresponding proportions for physician services are 59.6 per cent, 14.7 per cent, 25.6 per cent, and 0.1 per cent: that is, the elderly paid direct charges of some one-quarter.

A variety of policies has been introduced in North America with a view to contain hospital costs, of which prospective reimbursement is only one. The purpose of this chapter is to review these other policies and place prospective reimbursement in context. Comments are largely restricted to their impact on cost containment because this has been their primary purpose. It is recognized that policies are likely to have had non-trivial side-effects on, say, income distribution, the quality of care, and patient and provider satisfaction.

Hospital expenditure can be analysed in terms of hospital market supply and demand. Costs will be contained if supply and/or demand for hospital care can be reduced. Some have argued that supply and demand are not independent of each other, as traditional economic analysis might have us believe. By this we do not mean that, say, changes in supply will not influence the quantity demanded through altering price and/or non-monetary factors like time. Rather, we mean that if supply were increased then suppliers would be able to alter the demand for that supply at any given price. It is further suggested that if supply were increased, suppliers would so alter the demand for it as to maintain their incomes. If suppliers have this influence on demand, then more emphasis needs to be placed on their control than traditional economic analysis would indicate. Otherwise, attempts to control demand, to contain costs, are likely to be frustrated, or at least modified in their effect.

Chassin (1978) reviews several policies to contain costs, and the selection provides a useful starting point. Four groups of policies, not including prospective reimbursement, are identified. Their selection reflects the American bias of Chassin's review, but they can and sometimes do have a relevance for the Canadian situation too. We indicate their relevance for both jurisdictions. The policies identified by Chassin are

cost-sharing, health maintenance organization (HMOs), certification of need (CON), and utilization review (UR). Cost sharing and HMOs are clear examples of policies designed to influence the demand for hospital care. CON is a clear example of a policy designed to influence the supply of hospital care, and indirectly the demand for hospital care through its influence on the supply of alternative types of care. UR most directly influences the demand for care insofar as it defines which services would be allowable for third-party reimbursement.

In this section each of the above four groups of policies are examined for their impact on hospital cost containment.

Cost sharing

Cost sharing is usually thought of in terms of patient charges for the receipt of hospital care. In both America and Canada this term must be more broadly defined to include the federal-state and federal-provincial cost-sharing arrangements. Patient and intergovernmental cost-sharing arrangements are taken in turn. But in each case the rationale behind them is the same. Cost sharing imposes a cost on the participant with consequent income and substitution effects. If hospitalization is a 'normal' good, then cost sharing, through both these effects, should reduce the demand for it. The possibility of substitution means that cost sharing of non-hospital services can influence the demand for hospital services. It was partly with this possibility in mind that the finance of ambulatory care in America and Canada was described in the previous chapter.

Patient cost sharing, whether for hospital or ambulatory care, can take many forms. Among the most common are: deductibles, whereby patients would pay the first, say, \$300 of care received; co-payment, whereby the patient would pay a fixed amount, say, \$40 per day; co-insurance, whereby the patient would pay a fixed proportion, say, 25 per cent of the charge; and fixed indemnity, whereby the third party would limit its coverage to some specified amount or period, say, sixty days of care. This mixture of possibilities for cost sharing makes it difficult to know how much the demand for hospital care is likely to be influenced.

At present, few studies are available that give unbiased estimates of the impact of patient cost sharing on expenditure. Two sources of bias are identified here. One, noted by Newhouse et al. (1980) is due to the failure to measure the cost to the consumer (patient) because he/she often

faces a mixture of deductibles, co-insurance and fixed indemnity conditions. Bias is avoided by limiting the analysis to one such condition. Newhouse and Phelps (1976) do this by limiting their sample to those who face only co-insurance. The sample studied consists of heads of households in 1963, i.e., prior to Medicare and Medicaid. Physician-related as well as hospital-specific costs are included, and the mean value for co-insurance was 27 per cent (Ginsburg, 1976a, 314). They estimate the sample had an elasticity of hospital expenditure with respect to co-insurance of -0.24. That is, had the co-insurance rate increased from 27 per cent to 30 per cent, i.e., by one-ninth, then hospital expenditure would have fallen by 2.7 per cent ($= -0.24 \times 1/9$). As Barer et al. (1979, 44-6) point out, in practice, the poor and certain age groups, such as the young and elderly, would be exempt from charges altogether. Thus, within a representative population, raising co-insurance would have a considerably smaller effect on expenditure, in practice, than Newhouse and Phelps' estimate might first suggest.

Evans (1982, 388-39) also points out that most studies are not of the consumers' demand for care alone, but include the influence of provider response to changes in price (i.e., cost sharing). The above estimate by Newhouse and Phelps (1976) would come under this criticism. He suggests that, given prices, raising the patient's share will reduce utilization and hence provider incomes. Providers, he argues, will respond by generating an increase in the demand for their services, shifting the consumers' demand curve to the right to restore their income levels. Newhouse and Phelps (1976) show, of course, that incomes were not fully restored. Estimates of the impact of cost sharing on expenditure, corrected for these induced shifts of the consumers' demand for care, would be still larger. However, if providers do try to maintain their income levels, then the estimates given in Newhouse and Phelps (1976), and others like them, are the one policy makers will have to live with.

Newhouse et al. (1981) avoid both the above-mentioned sources of bias. Their sample is 7,706 persons, drawn from 2,756 families over the period from 1974-78. They estimate total expenditure per capita on in-patient and ambulatory care was 14 per cent lower when the co-insurance rate was 25 per cent as compared with when care was free. It was 18 per cent lower when the co-insurance rate was 50 per cent instead of being free (Newhouse et al., 1981, Table 1).

What practical scope is there for using patient cost sharing to contain

hospital costs? In America the introduction of Medicare and Medicaid substantially reduced co-insurance for hospital services and this, it has been argued, was the primary reason for the growth in hospital expenditure in the decade since then (Feldstein, 1977). A return to pre-Medicare/ Medicaid levels of patient cost sharing seem unlikely. But, at least for Medicare, there is a debate about the level of the deductibles and co-insurance (Grimaldi, 1981; and Long et al., 1982), and one may expect marginal changes to be made. The aged can, of course, supplement Medicare provision through voluntary insurance, and the major part of voluntary insurance taken out by them is for this purpose. Thus, increasing patient cost sharing for Medicare may reduce the federal government's financing problem, but its impact to contain public plus privately financed hospital costs will be modified.

Voluntary insurance also covers those younger in age. A variety of different schemes are offered, commercial as well as Blue Cross and Blue Shield. The extent to which cost sharing will change must largely depend on the consumer's response to the choices available. The consumer is not only concerned about the overall level of expenditure, but also with sharing risk with third parties. The less willing that consumers are to accept the risk of high bills, the lower patient co-insurance will be, with escalating effects on hospital and health service expenditure.

The situation is quite different in Canada. A strict interpretation of the federal HIDS Act and Medical Care Act all but prohibits charges for hospital and physician services if this would impede access to them. In fact, charges are made for them both, though the sums raised have been small in relation to total expenditure. Nevertheless, the Saskatchewan experience of small charges for hospital out-patient and physicians' services does indicate they can have a deterrent effect (Beck, 1974), and to that extent they infringe upon the federal legislation.

Canada differs from America in another respect that is significant for the adoption of patient cost sharing. In Canada private insurance is not permitted to compete with HIDS Act and the Medical Care Act of 1966. A curious situation could then occur of patient charges being effective in containing costs because they cannot be insured against, but not at such a high level as to make the absence of insurance intolerable. If pressure from physicians for extra billing continues, the present federal constraints are unlikely to last.

Health maintenance organizations (HMOs)

Health Maintenance Organization is an American term for a particular form of organization of services that pre-eminently is associated with prepayment by consumers for care from a specified set of providers. The main purpose behind HMOs is to reduce health service expenditure, partly by encouraging the use of preventive health services, but more importantly by so altering the provision of ambulatory care that hospitalization is thereby reduced. The Canadian equivalents that come closest to matching HMOs as a form of organizing health care are Health Service Organizations in Ontario, Centres Locaux de Services Communautaires in Quebec, and Community Health Centres in Manitoba, Saskatchewan, and British Columbia (Mennie, 1982b). However, these Canadian equivalents are not distinct from alternative forms of organization in Canada for their method of finance. Patient prepayment, insofar as any is required, is a feature common to all types of care. For the present, therefore, our description of the HMOs and the evaluation of its impact focus on its American experience.

As mentioned above, the distinctive feature of HMOs is that the consumer pays a regular premium, or has it paid by some third party which qualifies him or her for the receipt of care on demand from specified providers. Small user charges may be made, but the only additional substantial out-of-pocket expenditure, i.e., excluding the premium, would come from the use of health services not provided by the HMO (Luft, 1981, 65-71; Fuller et al., 1977, 728-30; and Gaus et al., 1976, 6-7).

What distinguishes HMO prepayment from conventional private or public insurance is that it is the HMO sponsors who bear the financial risk for such care as they have guaranteed to provide. Bearing financial risk is a distinctive feature of American HMOs: it is not in one of their closest Canadian counterparts. The HMO sponsors are varied: consumer groups, such as unions; providers, such as physicians; and other groups, possibly 'for profit'. In the end, the sponsors bear the financial risk and can, and do, become bankrupt. In the financial year 1980-81, twelve of the 130 federally qualified HMOs did so (OHMO, 1982a, 7).

Prepayment and the incidence of finance risk have different effects on the incentive to contain costs, as compared with the conventional system, in America, of patient cost sharing and fee-for-service physician reimbursement. The virtual absence of cost sharing, as noted above, is

likely to encourage subscribers to make more, not less, use of health services. It is the incidence of financial risk, and the method of physician reimbursement that can go with it, which provides the real incentive to contain costs.

In fact, the HMO definition, in America and Canada, does not stipulate how physicians are paid. However, in America physicians working in HMO group practices are usually paid a salary, by capitation or sessionally, and share in the HMO's net income; whereas physicians in 'individual practice associations', otherwise known as 'foundations for medical care', are normally paid on a fee-for-service basis just as are other physicians who are not hospital employees. As at June 30, 1981, individual practice associations accounted for 90 of the 243 HMOs and 1.6 million of the 10.3 million enrollees (OHMO, 1982b, Table 3). A salaried service with a share in the HMO's net income presents a double incentive to contain costs. Physicians will be under a greater incentive to identify redundant diagnostic procedures, to delegate activities to less costly non-physicians, to reduce the frequency of return visits and, in the case of hospital care, to substitute out-patient for in-patient care and to shorten stays when admission is thought necessary.

The HMO system of prepayment means that the HMO has a fixed budget that must cover all expenditures. If physicians are paid on a fee-for-service basis in this system then there is an inherent conflict of interest, because physicians can generate income only at the expense of reducing their HMO's net income. This particular conflict of interest is absent if physicians are paid on a salaried, capitation, or sessional basis. Whether salaried physicians would respond to the prospect of a share in the HMO's net income is another matter. For financial risk to influence physician behaviour the bonus involved would probably need to be a large proportion of the physician's net income and the physicians would need to be able to influence the size it could be. The latter condition is unlikely to be satisfied in larger group practices (Yett, 1967, and Newhouse, 1973) and, to that extent, the bonus would have a subordinate role in influencing physician behaviour. The dominant role would go to the method of reimbursement of the physician's basic income, being between a salaried (or capitation or sessional) service and fee-for-service. Physicians on a salaried service receive no material reward for extra activity, in contrast to those paid fee-for-service. The former, therefore, are less likely to generate additional costs.

Physicians in individual practice associations differ from the conventionally reimbursed physician only in sharing in the financial risk of the association. The incentives for this form of HMO to contain costs as compared with the conventional system depend entirely on the share physicians have in the financial risk of the HMO and the difference this can make to their net income. This is their only incentive to contain costs compared with conventional fee-for-service practice; and, because HMO prepayment is associated with lower patient cost sharing, it is hardly surprising that individual practice associations have often relied on other measures to contain costs, such as peer review, to ensure their solvency. Even so, some still become bankrupt.

As at June 30, 1981, there were 243 identified HMOs, of which 153 involved group practices in some way or another and 90 individual practice associations (OHMO, 1982b, Table 3). The corresponding numbers of subscribers are 8.7 million and 1.6 million, respectively. The less cost-effective fee-for-service model was thus far less commonly adopted. Cost savings also depend on physicians sharing in the HMO's financial risk. At best the evidence of its extent is indirect, and is based upon the number of subscribers. The majority of HMOs of both models were quite small: 84 per cent of group practice and 93 per cent of individual practice association HMOs had less than 50,000 subscribers (*ibid.*, Table 20). However, most subscribers were in an HMO which was larger: 78 per cent for group practices, but 34 per cent for the individual practice associations is common. Large size does not preclude risk sharing having an influence on behaviour. But special arrangements, such as the use of several profit centres within the HMO, would be necessary to avoid the 'free rider' problem. Otherwise, only group practice HMOs are likely to have contained costs through the rejection of fee-for-service as the method of physician reimbursement.

In conclusion, we can predict that, insofar as HMO prepayment reduces patient cost sharing, the demand for patient-initiated services would increase. If physicians are also paid a salary and a bonus depending on costs saved, then the demand for physician-initiated services would be reduced. If both changes are associated with prepayment, then the impact on total expenditure cannot be predicted. However, a reduction in hospitalization, which requires physician referral, would be expected, particularly if its cost were borne by the HMO. We would expect group practice HMOs to have a greater impact on costs and hospital use than individual

practice association HMOs.

Evidence to test these and similar predictions is hard to come by. One exception is for hospitalization. Luft (1981, chapter 5) in his review of HMOs draws together an impressive number of studies which, far more often than not, show hospital use to be lower for HMO enrollees than for their controls. Nevertheless, as Luft admits, the evidence cannot be unambiguously interpreted to infer the predictions made. One of the difficulties is the likely influence of bias in the population enrolled in HMOs as compared with the general population. Comparisons between HMOs and control groups may result in false conclusions. The direction of the possible bias is often not even known. Thus, if enrolment were open to all with community rates, as it was for federally qualified HMOs until the Health Maintenance Organization Act amendments in 1981 (OHMO, 1982a, 2), then patients most at health risk would be most likely to enrol in an HMO to reduce their financial risk from cost sharing. But if enrolment is not open - one reason why an HMO might not have sought federal government qualification - HMOs can practice cream skinning and avoid high health risk subscribers. Differential use of health services between HMO populations and control groups may thus simply reflect selection bias.

Barer (1981, 46-66) reviews a rather less comprehensive collection of evaluations of the impact of HMOs on hospitalization than Luft (1981, chapter 5), and concludes that differences between the study and control groups are not dominated by self-selection bias. Barer instead emphasizes the importance of the way physicians are paid, for the same sort of reasons as are given above. However, Barer also recognizes that the lower use of hospital services by HMO subscribers may reflect the way HMO practice is organized. In particular, (mixed) group practices could better afford facilities of their own which would make hospital referral, possibly as an in-patient, less necessary. In addition, group practices may have greater access to extended care facilities which offer a lower cost alternative to hospitalization. The lower hospitalization recorded for group practice HMOs as compared with individual practice association HMOs (Gaus et al., 1976) is consistent with the way care is organized, just as much as with the different financial incentives facing physicians working in these two different practice settings. It must still be a matter of speculation whether it is the way physicians were paid or the way their practices were organized that is responsible for the lower use of hospitals by HMOs.

Fuller et al. (1977) is the most impressive study known to us that

gives some idea of the magnitude of the impact of HMOs on hospitalization. They avoid selection bias by following the experience of a cohort joining an HMO group practice. They also avoid the influence of patient cost sharing by restricting their sample to the American Medicaid eligibles who, of course, pay no charges at all. The Medicaid sample was selected at random and invited to participate in an HMO program. This required them to change their physician, and a few additional facilities were added to those already provided from the Medicaid program to encourage them to do so. Participation was guaranteed for three years even if the enrollee ceased to be eligible for Medicaid. Enrollees could leave the HMO before then but were not allowed to return. Few withdraw voluntarily and virtually none were asked to leave by the HMO. Estimates of the impact of the use of health services compared the sample 22 months prior to enrolment with the 22 months after enrolment. Physician visits fell by 15 per cent and hospital admissions by 30 per cent. By comparison, both rose over a similar period for the control group who had remained on a fee-for-service system financed by Medicaid.

Luft's review also includes a much more limited number of evaluations of the impact of HMOs on total health services expenditure, i.e., on premiums, co-payments, and out-of-plan services (Luft, 1981, chapter 4). As noted above, one cannot predict that HMOs will unambiguously cause total expenditure to fall: expenditure on patient-generated services is predicted to increase, and that on physician-generated services is predicted to fall. None of the studies correct as fully as Fuller and his colleagues do for self-selection bias in the comparison between HMOs and their controls. Bearing this in mind, the studies invariably indicate that total expenditure per capita was lower for HMOs than for other forms of organization. The differences between the HMOs and their controls varied markedly, and were largest by far for Kaiser-Permanente plans. One study found a difference of 50 per cent, but this is halved to 25 per cent after correction 'for pre-enrolment admission and out-patient utilization rates' (Luft, 1981, 62). This corrected figure is not so very different from that found by Fuller et al. for hospital use.

In America, the federal government has been active in implementing HMOs through the passage of the HMO Act in 1973. This gave financial assistance to federally qualified HMOs, and required all but the smallest employers to give their employees the opportunity to enroll in a federally qualified HMO if one were available locally. The financial support has

been considerably reduced since 1981. Certain conditions must be satisfied for an HMO to become federally qualified, of which one, until 1981, was open enrolment at a community rate. In addition, a given range of services must be provided as part of the HMO.

The growth in HMO enrolment has been relatively rapid. In June 1974 there were 142 prepayment plans with an enrolment of 5.3 million. By June 1981 the numbers had increased to 243 and 10.3 million respectively, of which 129 and 7.3 million were federally qualified (OHMO, 1982b, 1 and Table 4). Nevertheless, still only 4.5 per cent of the population was covered in 1981, and it is only this large because HMO development has been significant in a handful of states.

The very limited development of HMOs in America is surprising given the federal support for what is apparently a cost-effective means of providing health care. HMOs are, naturally, unpopular with existing providers of alternative types of care. But one study available (Goldberg and Greenberg, 1981) suggests that they did not use state certification of need to inhibit HMO development in the period from 1966 to 1976. Moreover, since 1979, following an amendment to the Health Planning and Resources Development Act (PL 96-79), neither federally qualified HMOs with more than 50,000 subscribers nor new HMOs have required certification of need (Eastaugh, 1982, 480).

The unattractive feature of HMOs probably comes from the method of physician reimbursement that they can, but need not necessarily, apply. Physicians in America are accustomed to payment by fee-for-service, not by salary, capitation, or session, its unattractive alternatives. Without physician support HMOs will never develop on a nationwide basis.

Physicians in Canada are probably no more attached to a salaried service than their American counterparts. However, in Canada, as for the Medicaid population in America, there is an added deterrent to the effective development of HMOs as a means to contain costs. This comes from the (virtual) absence of patient cost sharing in Canada, which would otherwise inhibit subscribers going outside the HMO if they were not satisfied with the care it offered. Vayda (1977) graphically describes the difficulties due to out-of-plan use of two such schemes in Ontario which were exacerbated by the implementation of the Medical Care Act of 1966 in that province. In consequence, there has been even less 'HMO' development in Canada than in America. In 1982, there were 100 Centres Locaux de Service Communautaires in Quebec employing 9 per cent of family physi-

cians and serving some 5 per cent of the population there (Mennie, 1982b). The corresponding data for Ontario are 28 per cent, 3 per cent, and 1.5 per cent. There were only 3 or 4 health centres in Manitoba, Saskatchewan, and British Columbia, and none in any of the other provinces.

Certification of need (CON)

Certification of need is a form of public regulation designed to control the supply of health service facilities. The motives for CON are mixed. They include cost containment, more equitable distribution of health services, and the alteration of the balance of care. There would seem to be a particular need for CON in America if these public motives are to be satisfied. The combination of third party finance, cost reimbursement, and the ability of providers to influence demand through offering benefits at least cost tends to destroy the normal competitive market forces that would help ensure the benefits of provision match their cost. In such a situation, providers acting alone cannot be relied on to achieve the desired objectives. CON is designed to introduce in a formal way the interests of parties other than providers.

In Canada, the financial incentives are very different. The public monopoly of the insurance (third-party finance) of hospital (and physician) services has recently been recognized as potentially of great importance to cost containment, and some credit has been given to this feature for the virtual constancy of expenditure on health services as a proportion of GNP in Canada during the 1970s (Barer et al., 1979, 82; Evans, 1982, 376; and Mennie, 1983b, 12). This monopoly is the result of the legal restraint on private insurance covering services already covered by HIDSA and the Medical Care Act. Health care is a provincial responsibility, and federal and provincial funds are both channeled through the provincial governments. From April 1, 1977 federal funds have not been tied to specific uses, and the provincial governments have borne the full financial cost (benefit) from extending (withdrawing) health services under their jurisdiction. Other sources of hospital finance, by comparison, have been negligible.

Provincial governments have other financial responsibilities, and the hospitals and physicians must compete with them for such funds as are available. There is thus a strong incentive for provincial governments to

contain costs. In America, at least at the federal and state government levels, there are similar incentives. But in America there is no (public) monopoly. The fragmented system of insurance helps frustrate cost control by one party through the passage of extra costs to the other parties. Concerted action by the various third parties, resulting in an effective monopoly, is virtually absent in America. In Canada provincial governments have exercised their control of expenditure by introducing prospective reimbursement to control the rate at which care is reimbursed and by centralizing (at the provincial level) decisions as to which services would be 'allowable'. The latter, of course, corresponds closely to CON, and some idea of how it has operated in Ontario is given in chapter 7.

Planning has been decentralized below the provincial government level in Canada, for example to regional health councils in Quebec and to district health councils in Ontario. But their role has been advisory and they have had no funds to distribute. At best, they have been used to contain costs by adding another level of bureaucracy. Because they have had such a subsidiary role they are not considered further in this study.

The limited role of CON in Canada, because of the control at the provincial level by the provincial governments, largely restricts the discussion of this method of cost containment to the American experience. Voluntary schemes, involving the interests of several parties, have a long history in America (Havighurst, 1973). However, it is mandatory schemes that tend to be associated with the attempt to use CON to contain hospital costs. The first mandatory scheme was introduced in New York state in 1964. The first federal scheme was Section 1122 of the Social Security Act amendments of 1972 (PL 92-603). Section 1122 is a uniform scheme in which state participation has been voluntary. It has covered capital expenditures exceeding \$100,000 and changes in bed use or services which involve capital expenditure, however small, at all hospitals, nursing homes and on ambulatory care. By mid-1974 the number of states participating in Section 1122 was 37. At the same time 24 states had CON schemes of their own which covered, with one exception in each case, hospitals and nursing homes. All but five of the 24 schemes also covered ambulatory care (Harman, 1977).

The federal National Health Planning and Resources Development Act of 1974 (PL 93-641) made CON mandatory for all states. States are still allowed to design their own schemes, and differences in coverage, review, appeals procedures, and sanctions have continued. However, major health

service facilities, including hospitals, nursing homes, and HMOs are all covered, as are any capital expenditures exceeding \$150,000, and changes in bed use and services, even though no capital expenditure may be involved (Hanley, 1977, 59-62). PL 93-641 was to be implemented by September 1980, and by 1979 all but three states had complied with this legislation (Sloan, 1981, fn. 5). Section 1122 did not lapse with the introduction of PL 93-641, and the majority of states were still participants in Section 1122 in 1979 (Sloan, 1981, fn. 6).

The main motive behind the federal CON schemes was to contain costs. This motive was not one shared by the agencies set up to implement them, at least in the early days of 1974-75 (Harman, 1977, 31). More commonly the agencies had a commitment to improve the quality and distribution of health services, particularly to underserved areas. In three states, agencies used them to ensure the financial viability of existing providers.

The effectiveness of CON to contain costs depends on a number of factors: the composition of the review board, the guidelines upon which the review is based, and the sanctions used to enforce recommendations of the review board. The latest federal scheme, PL 93-641, goes a long way to ensuring that interests other than those of providers are represented on the review board, the Health Systems Agency (HSA). Consumer interests have a numerical majority. However, the extent of concern of consumer groups over containing costs through limiting the supply of health services can easily be exaggerated. Under PL 93-641, the HSA is not responsible for the costs generated by its recommendations and, although it may order its priorities, cost need not be one of its concerns. Consumer interests would presumably wish to avoid obvious cases of excess capacity and the duplication of services; but, otherwise, they are quite likely to accept any project offering some marginal benefit, however hypothetical and whatever its cost.

The incentive of the HSA to contain costs would come, if at all, from the existing providers represented on the review body. CON gives them an effective control, with an official standing, which could be used to inhibit competition from all sources. Hospital costs would be contained if competition from additional hospital services were inhibited. Quite the opposite would result if competition from alternative types of care, particularly HMOs, were inhibited. The latter was very much in Havighurst's (1973) mind in his opposition to CON. Predictions of how HSA recommend-

ation, will influence hospital costs cannot therefore be made. However, in the case of the HSA recommendation that it be the final arbiter in matters of certification, considerations of cost consequences (of certification or its refusal) are more likely to be kept in mind, if only because the state must bear its share of the cost of Medicaid.

It is exactly this situation which suggests that the enforcement of CON in Canada, through the provincial health insurance plans, would contain costs when this was thought important. The impetus to contain costs has strengthened, and had a greater effect, with the passage of the Federal-Provincial Fiscal Arrangements and Established Programs Financing Act of 1977. Since then, provincial governments have not only had the benefits of making policy, but also the burden of funding the full cost of marginal adjustments, instead of approximately one-half as previously.

A second condition for CON to contain costs is that agencies have a set of guidelines with which to review applications. PL 93-641 goes some way toward ensuring that this condition is met. Prior to final designation as an HSA, the agency must develop a regional health plan which has federal government approval (Medeiros, 1977, 154). But guidelines in themselves are not sufficient to ensure compliance. Political will to enforce them is required, especially as the guidelines are known to have a weak theoretical basis at best. A substitute for political will might be arbitrary limits (caps) on capital expenditure by the state government. The priorities would have to be enforced.

The guidelines that probably have had the greatest acceptability are those for bed supply, though their theoretical basis is hardly more valid than for other facilities. Thus in America, the Hill-Burton program had bed norms of 4.5 to 5.5 for 1,000 population, depending on population density (Gross, 1972, 64); and in Canada, the provinces of Quebec and Ontario have corresponding norms for acute short-term beds of 3.5, raised to 4.0 in the more sparsely populated areas of Ontario (Mennie, 1972c, 20). Guidelines for other facilities, say, CAT scanners, are more significant in their absence.

Salkever and Bice (1979, 18-24) develop this distinction between targets (norms) for beds and the absence of targets for other facilities. They make the obvious point that proposals for additional beds are more likely to be turned down where there is a defined bed surplus; and, since the target is usually set in relation to existing provisions, that some areas inevitably are in a surplus situation. But Salkever and Bice also argue

that the cost of financing, whether internal or external, increases with the funds required. Thus, if fewer funds can be used to increase bed supply, more remain available for other uses. This reduces the financial cost of other types of capital projects and encourages hospitals to put forward more of these projects. Evidence cited below gives some support for their prediction.

The third condition for CON to contain costs is that the sanctions deter applicants from disregarding agency recommendations. Section 1122's sanctions are uniform for all states: they are the loss of the Medicare, Medicaid, and maternal and child health program shares of the capital cost (interest plus depreciation) of the uncertified project. PL 93-641, on the other hand, lets states choose their own sanctions. These would include the withholding of an operating licence, criminal and civil penalties, injunctions and the refusal to reimburse (Hanley, 1977, 62-64). No indication is given by the federal government as to which one the state governments should use. All the federal government has required is that the sanctions be effective. Failure to be effective could result in federal intervention.

The design of CON is important to its success in containing costs; so also is the response of providers. Some have argued that CON may contain costs through deterring potential proposals from further consideration should they not satisfy the HSA's guidelines. But it has also been suggested that CON may have the opposite effect, at least prior to its introduction, should doubtful investments be hurried through in anticipation of the refusal of their certification by the HSA. In addition, more long-term effects operating to inflate expenditure could arise from the cartel-like character of HSAs. CON could be expected to help protect successful applicants from competition and raise the profitability of their investment. This prospect may encourage more proposals to be made and, overall, approved.

In conclusion, the only identified feature that commends CON for its effectiveness in containing costs are the sanctions it can impose. But the effectiveness of sanctions depends on an adequate screening of proposals by HSAs and their respective state agencies. There are a number of reasons to believe that this condition will not be met unless there is the political will to enforce unpopular decisions to turn down proposals that have evident benefit.

These conclusions basically reflect theoretical arguments. It has also

been suggested that the CON program has been greatly weakened through the poor administration of HSAs and the failure of state agencies to take effective action by giving much more attention to the development of utilization review as a method to contain costs (Martin, 1983). Both these shortcomings are expressions of the absence of the political will to develop CON as an effective means to contain costs.

Six studies known to us evaluate one or more of the CON programs for their impact on cost containment. They cover the period from 1963 to 1979. Those covering the earlier years limit their evaluations to state CON programs. Those covering the later years also include Section 1122, which first came into force in 1973. All six evaluate CON for its indirect effect on cost containment via its control of capital expenditure on beds and/or plant assets per bed. Three also evaluate CON for its impact on unit (recurrent) costs, and one for its impact on total (recurrent) expenditures. Four of the studies analyse the impact of CON at the state level and so include the hypothetical deterrent effect on potential entrants to the hospital market as well as on existing providers. The six studies are now briefly reviewed for their evaluations of CON in terms of bed supply, plant assets per bed, and unit costs, in that order, beginning with the analyses of state data.

Sloan (1981) covers the most extensive period, 1963 to 1978, evaluating state CON programs and Section 1122. State CON programs are differentiated by their maturity. Sloan (1981, Table 2) finds no evidence that either form of CON is significantly correlated with changes in bed capacity at the state level. This result conflicts with the analysis by Salkever and Bice (1979, Table 3) covering the period 1968 to 1972. It is, however, supported by Misek and Reynolds (1982, Table 2) for the periods 1968 to 1972 and 1972 to 1976, and by Eastaugh (1982, Tables 3 and 4) for the period 1975 to 1979.

The studies cited above evaluate CON for its impact on bed supply at the state level. The two studies that evaluate CON for its impact on bed supply at existing hospitals also give conflicting results. Joskow (1980, Table 3) finds that state CON programs restricted the growth of bed supply in 1976 in a sample of 346 private non-profit hospitals. Sloan and Steinwald (1980, Table 3) find to the contrary that such schemes tended to raise the rate at which bed supply increased between 1970 to 1975 for a sample of 1,228 non-federal short-term general hospitals. Sloan and Steinwald identify some of the adverse effects occurring in anticipation of

the implementation of 'comprehensive' CON schemes. They found that Section 1122 had no effect on bed supply.

Although Section 1122 is found consistently to have no effect on bed supply, these studies give very mixed results of the impact of state CON schemes. Further analysis is needed.

We now examine the impact of CON on other forms of capital expenditure. Salkever and Bice (1979) give good reasons to believe that CON is an advantage to the state. We refer to three studies that evaluate CON for its impact on plant assets per bed. We begin with the two that do so at the state level. Salkever and Bice (1979, Table 3) and Eastaugh (1982, Table 3) both find that states with CON schemes had significantly higher rates of increase in the periods from 1968 to 1972 and 1975 to 1979 respectively. Salkever and Bice estimate increases would have been from 15.2 per cent to 19.7 per cent if the state CON scheme had been in operation the full four years. Eastaugh gives very similar estimates for the four-year period 1975-79. On the other hand, Eastaugh finds no evidence that Section 1122 is significantly correlated with changes in plant assets per bed. Sloan and Steinwald (1980, Table 3), covering the same period, find that neither Section 1122 nor state CON programs, irrespective of their maturity, had an effect on the growth of plant assets per bed.

Thus again there is some conflict in the results of studies of the impact of state CON programs. Again, Section 1122 is consistently found to have had no effect.

The eventual purpose of CON is to contain recurrent expenditure. Three of the studies referred to evaluate CON for this dimension. All do so for unit costs: Salkever and Bice also evaluate CON for its impact on total expenditure. Again, the results are mixed.

Salkever and Bice (Tables 8 and 10) find that the direct impact of state CON programs between 1968 and 1972 was to lower per diem costs and state expenditure per capita. However, the direct effect of lowering unit costs is largely offset by the indirect effect on unit costs of CON raising plant assets per bed. Sloan and Steinwald (1980, Table 2) study individual hospitals between 1970 and 1975. They find (predictably, when one remembers their other results) that state CON schemes raised unit costs, but that Section 1122 left them unchanged. Finally, Sloan (1981, Tables 1 and 2) reports very mixed results for the impact of state CON schemes and Section 1122 on unit costs. None, however, indicate that unit costs were higher in states with a CON program of either kind.

In conclusion, all the studies seem to be agreed that Section 1122 had no impact on capital expenditure or on unit costs. On the other hand, they also give very mixed results for the state CON programs. The choice of model and specification used to evaluate them may partly explain the differences, as comparisons within individual studies demonstrate. In addition, the evaluations usually refer to different periods. Only occasionally are the results for individual hospitals inconsistent with those for states. And finally, state CON schemes are not uniform, even if they had common minimum conditions following the implementation of PL 93-641. None of the studies go further than differentiating the maturity of the CON scheme and the proportion of the period under study during which it was in operation. Some idea of the schemes' characteristics might have helped sort out the very mixed results. We show how this can be done for prospective reimbursement in chapter 6.

Utilization review (UR)

Utilization review has two basic purposes: quality assurance for care provided, and cost containment. To the extent that UR can reduce 'wastage' and eliminate the less efficient modes of providing health care, these two purposes are not in conflict. Otherwise they are. Without further information one cannot predict the impact of UR on hospital cost containment.

Utilization review has a long history in America. Its original purpose was quality assurance. In 1918, the American College of Surgeons initiated its hospital approval program (Stuart and Stockton, 1973, 347). Post-war developments made by the Joint Commission on Hospital Accreditation resulted in their recommending UR in 1963. In 1966, UR was made a requirement for accreditation (Chassin, 1978, 27). Parallel developments for the employment of UR for quality assurance took place in Canada.

The use of UR to contain costs is a comparatively recent development, and limited to America. In Canada, neither federal nor provincial governments have used this method of control, although medical data can be generated to permit them to do so. Voluntary insurance hardly exists for the hospital sector in Canada, and any use it might make of UR to contain costs would have, at most, a limited impact.

In America, intervention at the federal government level first came with the Medicare program, and was enacted in 1965. UR was extended to

the Medicaid program in 1967 (CBO, 1981). Dissatisfaction with the ability of these forms of UR to contain the growth in expenditure on the Medicare and Medicaid programs led to an amendment to the Social Security Act (PL 93-603) in 1972 (Havighurst and Blumstein, 1975, 38-41). New methods of UR, Professional Standards Review Organizations (PSROs), were mandated to replace the existing ones for Medicare and Medicaid beneficiaries as soon as possible, and to be extended to patients funded by the federal Maternal and Child Health, Crippled Children's Services, and End Stage Renal Dialysis Programs.

Utilization review may take many forms other than PSRO, for example, 'prior authorization' and 'second opinion' programs. UR has also been sponsored by third-party finances other than the federal government, for example, Blue Cross, Blue Shield, and the insurance companies. The focus in this section, however, is on the federally sponsored PSRO program.¹

PSRO's basic features involve exclusive peer review by physicians with the object to 'promote the effective, efficient, and economical delivery of health care services of proper quality for which payment may be made under the (Social Security) Act' (CBO, 1979a, 1). To meet this standard, services must conform to appropriate professional standards, be deemed medically necessary, and be provided in the most economical but nonetheless appropriate setting. The PSRO program is directed at short-stay hospitals, long-term care, ambulatory care and hospital ancillary services. To date, the focus of attention has been on in-patient care at short-stay hospitals.

PSRO membership is restricted to physicians, and open to all those licensed to practice in the area under its jurisdiction. The majority of physicians in areas with an active PSRO are members. Non-members are encouraged to participate in its activities. PSROs can delegate their functions to hospitals, and in September 1976 this occurred for more than 70 per cent of hospitals participating in the PSRO program at that time (Blumstein, 1978, 475). Nevertheless, PSROs retain authority, responsibility and accountability for all their activities, whether delegated or not. The possibility of abuse because of peer review by physicians is reduced by requiring that the physician conducting reviews should neither provide care for the patients he reviews nor have a financial interest in the institution providing the treatment. It was a weakness of the original scheme for the Medicare and Medicaid programs that the review was delegated to

hospitals subject to little external control over their own decisions (Havighurst and Blumstein, 1975, 51).

There are 203 designated PSRO areas, of which 28 are on a state-wide basis. Individual PSROs have discretion over the exercise of their responsibilities. Two bodies, however, exist to review their activities. One is at the state level in those states with three or more PSROs. The other is at the national level, the National Professional Standards Review Council. It is the latter body that poses the greater threat to the autonomy of individual PSROs.

There was some delay in the establishment of PSROs, even after the designation of their local responsibilities by the beginning of 1974 and the publication of the final regulations near the end of that year. This delay was at least partly due to the need to obtain the support of physicians. Thus in the fiscal year 1976, only some 8 per cent of Medicare and Medicaid patients were covered by the PSRO program (CBO, 1977, 35). However, by mid-1978, 118 of the 203 (58 per cent) of the designated areas had an active PSRO, and by 1980 the proportion had risen to two-thirds (CBO, 1981, 7).

PSROs use three instruments to exercise their responsibilities: concurrent review of admissions and continued stay, medical care evaluation studies, and profile analysis. The emphasis during the 1970s has been on concurrent review, though more recently the other two mechanisms have become much more important (Goran, 1979).

The main purpose of concurrent review is to assess whether the hospital is the appropriate setting for care, and guidelines have been developed for this assessment. PSROs and delegated hospitals, with PSRO approval, may develop their own guidelines, but in practice most PSROs use American Medical Association criteria for admission, and data collected by the Professional Activity Study on regional experience for continued stay (CBO, 1979a, fn 7).

The admitted patient is reviewed by a 'review coordinator' for the appropriateness of the admission and, if accepted, a date is set for a review for continued stay should the patient not have been discharged meantime. The review coordinator is usually a nurse, but need not be. If admission or continued stay is denied by a review coordinator, that denial is referred to a physician for confirmation (Goran et al., 1975). The physician's decision is final, unless the patient, his/her practitioner or the provider decide to appeal. Appeals may be taken to the local

(PSRO), state, and then national level. Denial has meant a refusal to continue reimbursement for care provided. Late in the 1970s, additional sanctions were introduced whereby the practitioner or provider could be fined up to \$5,000 to recover the cost of the 'inappropriate' care. They could even be excluded from the Medicare and Medicaid programs (CBO, 1981, 10-11). One study of limited applicability suggests that the fiscal intermediaries may be reluctant to impose sanctions in practice. It refers to the experience of one PSRO over a two-month period in 1980, when one-quarter of patient-days defined as medically unnecessary and inappropriate were, nevertheless, reimbursed (Segal and Gardner, 1981).

At first all admissions were reviewed but, for a number of reasons, by the late 1970s concurrent review started to be targeted to select groups.

To date, evaluations of PSROs have reflected the impact of concurrent review on bed use at short-stay hospitals. The impacts that medical care evaluation studies and profile analysis may make are topics for study in the future. Nevertheless, a few observations on them both are not inappropriate, if only because they have implications for the future efficacy of concurrent review.

Medical care evaluation is similar to medical audit, and its prime concern is quality assurance at the local level. PSROs and delegated hospitals are mandated to have at least one study in progress at any time, and to have completed four in a year. Medical care evaluation studies involve the prior definition of standards of care. Practice is expected to change if it fails to conform to the accepted standards and PSROs are encouraged to follow up to ensure that changes in the desired direction have taken place (Goran, 1979). The focus of medical care evaluation studies on the quality of care provided may, as an indirect result, indicate new guidelines for use in concurrent review.

Profile analysis depends on the development of the PSRO hospital data discharge set. The purpose is again to identify local problems, and this is usually done by comparing patterns of care over time or with other institutions or areas. The comparisons may be at the level of the patient, practitioner or provider. Profile analysis may be put to several uses, including by the national body to monitor individual PSROs and by PSROs to monitor individual practitioners or providers. In the latter cases it may indicate topics for medical audit, with the eventual purpose of improving the quality of care and refining the guidelines for concurrent review.

This concludes our descriptions of PSROs. There have been many evaluations of the impact that PSROs and other forms of UR have had on hospital use and costs. However, in common with the evaluations of the impact of cost sharing and HMOs, reviews of these studies which have subsequently appeared are agreed that most of the original evaluations have serious methodological flaws (i.e., CBO, 1979a, 14-18). Two promising exceptions evaluate the experience for PSROs on a nationwide basis (CBO, 1979a, and 1981).

The two compare change in patient-days, over the periods 1974 to 1977 and 1974 to 1978, at short-stay hospitals by Medicare enrollees, in areas with an active PSRO as against those in areas without one. Those areas without an active PSRO would still have a federal government UR scheme mandated for the Medicare (and Medicaid) programs. The differences compared, therefore, follow from exclusive peer review by physicians and from guidelines on hospital practice which are externally defined with sanctions to enforce them.

The study covering the period 1974 to 1978 indicates that the increase in patient-days was 1.2 per cent to 1.5 per cent less in areas with an active PSRO, although the (latter) estimate is significantly different from zero only at the 10 per cent confidence level. The relative decline was of a similar order of magnitude for the period 1974 to 1977. The studies indicate marked regional differences. The greatest impact occurred in the Northeast, where the rise between 1974 and 1978 was 4.8 per cent less in areas with an acting PSRO. Surprisingly, the maturity of the schemes had no statistically significant impact on the change in bed use, even though more hospitals were covered and medical care evaluation studies and profile analyses were more fully developed. Finally, the impact that PSROs had on patient-days was primarily on the length of stay, and not on admissions.

Neither of the above studies included in their estimates the consequences of eliminating inappropriate use of in-patient care at short-stay hospitals on the demand for ambulatory or nursing home care. In addition, estimates of the cost of administering the PSRO scheme suggest that the federal government hardly covered even the savings it made on in-patient expenditure. Part of the federal government's savings have been achieved only at the expense of others, as a result of a fall in its share of overhead costs. On the more positive side, it should be recognized that if profile analysis is successful in identifying local problem areas, then

targeted concurrent review should be more effective than if it is applied to all admissions. Finally, it should be remembered that these evaluations refer to the application of PSROs to the Medicare program. Possibly the financial sanction of denying continued reimbursement represents less hardship to this group than the others covered by PSROs, and to that extent underestimates the deterrent effect on other groups.

What explanation can one make for the small impact? One referred to already is the effective absence of sanctions and their small deterrent effect on hospital use by the Medicaid population. But even if sanctions are imposed and prove to be an effective deterrent, suitable guidelines are also required. Can one expect peer review to recommend guidelines that would result in a sizeable drop in hospitalization, especially when the cost consequences of the guidelines are not borne by the PSRO? Even supposing the formal procedures used in concurrent review avoid the conflict of interests that physicians might otherwise face, physicians may, nevertheless, genuinely disagree as to what is 'appropriate' care. Scientific standards to provide criteria and to guide physicians are conspicuous in their absence (Goran, 1979, 29); and guidelines have tended to be based on a guarantee that current practice will continue. Limits imposed to avoid the upper extreme of hospital use, however arrived at, are of questionable value when they encourage physicians at the other extreme to make more use of hospitals. Finally, even when PSROs are agreed that the care provided is neither appropriate nor medically necessary, alternatives may not be readily available. The guidelines could reflect the shortfall of alternative facilities.

This catalogue of possible explanations for the small impact of PSROs on hospital use in the 1970s does not, of course, preclude this form of UR from having a far greater impact in the future. A vital ingredient may have been missing. As in the case of certification of need, it may have been the lack of political determination that hospital use should be substantially reduced. An infusion of that ingredient might make good all the possible shortcomings identified above.

Summary and conclusions

Five groups of policies to contain hospital expenditure are identified. They reflect an American bias, but some could be applied in Canada too. The restoration of patient cost sharing to its former dominance is not a

realistic possibility in America or Canada. Modest increases in its magnitude are politically more feasible in America than in Canada. As federal legislation in Canada currently stands, patient cost sharing must not be a deterrent to consumers. But even low charges for physicians' services are shown to have been a deterrent. Even apart from legislative constraints, efforts to increase patient cost sharing are likely to have only a modest impact on containing hospital costs. Those most likely to use hospital services - the elderly and indigent - would continue to be exempt from increases in cost sharing; those not exempt could extend their voluntary insurance. Moral hazard would still be a problem, and all the public sector would have achieved is a shift of part of its share of the cost.

Health maintenance organizations are a promising means to contain hospital expenditure, but are only likely to be effective in doing so in America. Containing (hospital) expenditure depends for its success on discouraging the use of out-of-(HMO)-plan services. An obvious solution is to charge subscribers when they do so. However, Canadian legislation does not permit this solution. In America, HMOs still cover only a tiny fraction of the population, although the proportion is appreciable in a few states. Federal regulations covering federally qualified HMOs may have limited the development of this type of HMO, but the development of other types of HMO has been equally limited. Yet HMOs offer health care at significantly lower cost. The limited development may be due to the unwillingness of physicians to participate in this form of organization. Certainly a salaried service in a team setting is an unattractive prospect to someone who sees him/herself as an independent practitioner.

Certification of need is a promising way to regulate the supply of health services, and particularly hospital services. Some credit should be given to this sort of arrangement in explaining Canada's success in containing the growth of health services expenditure in relation to that of GNP over the 1970s. However, evaluations of American schemes seem agreed that the federal scheme, Section 1122, failed to have an impact. The evidence is contradictory for the state CON programs.

Utilization review is another promising method to contain costs, although it can generate costs through its attention to ensure adequate quality care. UR is used in America and Canada, but only in America has the federal government used it to contain costs. Evaluations suggest that its early experience has been disappointing in this respect.

Evaluations of these four measures at the national level in America

suggest that they have had only a marginal impact on cost containment. Cost sharing is limited in its application because of exemptions, and private insurance is available for those not exempt as an alternative. Individual HMOs have had the largest impact, but only a tiny fraction of the American population are covered by them. CON has now been adopted on a nationwide basis, but HSAs and state agencies have had only a marginal impact on capital expenditure and hospital costs, if any at all. UR through PSROs has also now been adopted on a nationwide basis. Its application to the Medicare program suggests that the impact of individual PSROs on hospital use has been marginal. The differential experience of HMOs compared to CON and PSROs would suggest that measures shown to have drastic effects on hospital use and their income are not likely to be accepted on a nationwide basis, and that those with only a marginal impact can be nationally adopted with federal government support within five to ten years. This conclusion is scarcely encouraging for prospective reimbursement.

However, these measures should not be seen in isolation, as too often they were at their beginnings. It is not to be expected that HMO development and the extension of patient cost sharing and UR will do much to contain costs by reducing the demand for care, individually or even together. Emptying beds saves only marginally on hospital expenditure, and offers a strong temptation simply to admit other patients. Reducing bed supply and the availability of other facilities is both much more cost-effective and more permanent in its impact. This gives an important role to CON. The simultaneous implementation of measures to reduce the supply of and demand for care would be more effective still.

How does prospective reimbursement fit in here? Simply that it provides a way to ensure that control is kept on expenditure once a budget had been agreed. It is one weapon in an armoury to ensure hospital and health service expenditure are set at such levels, distributed in such ways, and satisfy such needs that they meet general approval. In Parts II and III, prospective reimbursement is evaluated for its impact in this direction. Prospective reimbursement should not be considered a trivial policy when compared with the four others reviewed. The alternative to prospective reimbursement is retrospective reimbursement, which several have seen as important as the extension of third-party finance for the growth in hospital expenditure.

NOTES

- 1 The following description has drawn heavily from Blumstein (1978), Goran (1979), Goran et al. (1975), and Havighurst and Blumstein (1975). It has also benefited from discussions with Anne Martin.

The American Economic Stabilization Program and other prospective incentive schemes in America and Ontario, Canada, are reviewed in this study for their impact on hospital performance. The review of the American experiences is drawn mainly from published studies which adopt a variety of different methodologies, even though we have selected only those which evaluated hospital performance in terms of costs and, in some cases, bed use. This variety inevitably causes problems of interpretation. The first two topics in this chapter are directed at facilitating this interpretation.

The third topic recognizes that the schemes to be reviewed have been implemented in many different jurisdictions, and the experience of any one may not be directly transferable elsewhere because the circumstances in which it would operate are different. With the exception of the Economic Stabilization Program, none of the schemes reviewed are national in scope. Nevertheless, there are similarities at the national level which are not common to America and Canada. Attention is therefore drawn to some possible differences between America and Canada as partially represented by Ontario, for their influence on the impact of schemes on cost containment.

The fourth and final topic outlines a taxonomy to classify the characteristics of prospective incentive schemes. The various schemes have had mixed results, judging by how much of their financial targets have been achieved. The purpose of the taxonomy is to identify whether some particular characteristics have been more important than others. The taxonomy developed in this chapter is applied to all the schemes reviewed where possible.

The choice of model

The purpose of prospective reimbursement has been primarily to contain costs, and several evaluations have been made of its impact in this respect. Feldstein (1971b and 1977) provides useful points of reference. Feldstein hypothesizes that hospital cost inflation has been the consequence of excess demand for in-patient care which, in turn, is derived from identifying market supply and demand. Such models are normally conceived of in terms of price inflation. The justification for using it to study cost inflation is that changes in prices have been dominated by changes in costs, not profits. This was certainly the situation from the mid-1960s to the mid-1970s (Ginsburg, 1978). Models evaluating the impact of schemes on the level of unit costs have also emphasized market supply and demand conditions. There is thus little to distinguish the theoretical bases of both types of models. Sloan (1981), for example, is quite explicit in his use of this approach and employs the same set of explanatory variables to analyse the level of unit costs and its change over time.

Many models include factors that would be expected to influence market supply and/or demand. However, prospective reimbursement is designed to influence only market supply. The Economic Stabilization Program was specific in this respect, and limits were set to factor price increases. None of the other prospective incentive schemes known to us were anything like as specific as to how market supply was to be influenced, but it is quite clear that this was their purpose.

All the American schemes reviewed, and the Economic Stabilization Program for part of its duration, had patient cost targets as a feature. Irrespective of the dimensions of this target, costs could be contained through one of three avenues, given the quality of care provided. One avenue is to control increases in unit factor costs. The Economic Stabilization Program was designed with this avenue in mind. A second avenue is to control the growth of resources from either additions to existing resources or the introduction of new technology. A third avenue is to improve allocative and X-efficiency. A number of studies of British National Health Service hospitals have found strong evidence of allocative inefficiency (Feldstein, 1967; Lavers and Whynes, 1978; and Milne and Proctor, 1980). No similar studies of the existence of X-inefficiency in hospitals are known to us, but Leibenstein (1966) gives evidence that it is a pervasive and non-trivial phenomenon even in the for-profit sector.

Usually the target was expressed in terms of per diem (patient-day) costs, or of its change over time. Such a measure of unit costs could also be influenced by altering bed use as well. It is well established that the marginal costs per diem and per case are smaller than their respective average costs by an order of magnitude (Lipscomb et al., 1978). Those running the hospitals would be well aware of this fact. Thus, per diem costs could be reduced by lengthening patient stay, and the latter need not have been the consequence of reducing staffing levels per bed which has an influence on per diem costs of its own. Had the target been expressed in terms of (per) case costs, then the latter could be reduced by increasing admissions accompanied, if necessary, by a shortening of patient stay through increases in the employment of resources per bed.

Finally, hospitals may reduce the quality of care. The proposition that the primary purpose of hospitalization is to alter, favourably, the natural history of disease is incontestable. The hospital can still care for patients even if a favourable outcome cannot be achieved. Invariably, however, hospital cost studies focus on activity, and give no attention to its outcome. In other words, the characteristic that justifies hospitalization - the quality of care provided - is either omitted from the models tested or assumed to satisfy some minimum standard. The omission, with its corresponding assumption, has been due to lack of data, not from deliberate choice.

Feldstein (1977) has measured the quality of care in terms of the employment of resources per diem, on the assumption that the two are correlated. However, altering the employment of resources may change bed use, not the quality of care. Evidence that it changes bed use is very strong. Staffing levels per head are highly correlated with length of stay and, to a degree, with bed occupancy: negatively with the former and positively with the latter, as one would expect from production function theory. Perhaps surprisingly, evidence that the employment of resources influences the quality of care is much weaker. Summaries of evaluations of prospective reimbursement schemes in New Jersey, Rhode Island, and West Pennsylvania (Hellinger, 1976) all indicate that those schemes which reduced provision per diem did not reduce provision per patient. If these experiences are at all typical, then the omission of quality of care from the analysis is perhaps not quite as serious as might at first be imagined. In other words, perhaps minimum standards have been applied to patients.

The above theory of cost inflation has identified five avenues by which prospective reimbursement schemes may influence it. Any model that includes all five would leave no residual to be explained by prospective reimbursement. This point is rarely appreciated in any of the studies reviewed. None in fact include allocative and X-efficiency or the quality of care and, to that extent, some residual role is left to the prospective reimbursement variable. There can be little doubt of the probable importance of the three remaining avenues if prospective reimbursement schemes are to contain costs. For example, the Economic Stabilization Program was designed to control factor price inflation for the whole of its duration. And a few of the studies reviewed show, quite clearly, that bed use was modified in order to achieve the patient cost targets set by prospective reimbursement. The full impact of prospective reimbursement can only be quantified if all five are omitted from the model. If any of them are included in the model, the role assigned to prospective reimbursement is correspondingly reduced.

The choice of specification

The choice of specification also has an important bearing on the evaluation of schemes, largely because of the kind of comparisons made. Usually comparisons are between hospitals. This is hardly possible for the Economic Stabilization Program because all hospitals were subject to this federal legislation. Instead, the same hospitals must be compared, looking at their experiences prior to, during, and following the termination of the program. This is commonly the basis for its evaluation. Adjustment for concurrent changes external to the program should be made if the magnitude of its impact is to be correctly measured. The difficulty of doing so successfully can be underestimated.

The same kind of comparison could be used for evaluating individual prospective incentive schemes and, indeed, it is used in one of the studies reviewed. Usually, however, comparisons are of two sets of hospitals: those participating in the scheme, or the study group; and a set of similar hospitals not participating in the scheme, the control group. It seems improbable that any model, however comprehensive, would identify all the influences, apart from the prospective incentive scheme, that account for the differences between the two sets of hospitals. Yet, if the impact of these other influences is not adjusted for, then the magnitude of the

impact estimated for the scheme is likely to be biased. This source of bias is the result of pooling cross-section and time series data so that $E(e_{i,t}, e_{i,t'}) \neq 0$ where $e_{i,t}$ is the error term for hospital i in period t .

Pooling cross-section and time series data does not necessarily cause bias. It does so, however, most commonly if the data refer to the levels of activity, say, the level of unit costs. An example of the magnitude of this source of bias can be found in Salkever and Bice (1979, Tables 7 and 8) where two sets of estimates are given, one corrected and one uncorrected for bias. Bias from pooling cross-section and time series does not seem to be a common problem in the analysis of changes over time, as for example unit cost inflation. In this case $E(e_{i,t}, e_{i,t'}) = 0$. Certainly, this view is supported from our own evaluation of the new West Pennsylvania scheme, and from the consistent estimates taken from a variety of different studies with different model specifications of basically the same set of schemes (Chapter 4).

In Chapters 4, 5, and 6, we draw on studies that evaluate prospective reimbursement for their impact on the level of unit costs as well as their change over time. Two sets of studies can make some claim for inclusion in this review. The first set tries to avoid the problem of bias by a suitable model specification. This is done by accepting that a model capturing all except random influences is unlikely to be found. Instead, data are collected on the study and control groups set up for periods when the scheme is not operating as well as it has. The two groups are then distinguished from each other for the whole period studied as well as for that part which represents the duration of the scheme. This is the approach most commonly used by the studies reviewed here.

An alternative approach is to recognize that $E(e_{i,t}, e_{i,t'}) \neq 0$, and use an estimation procedure to correct it. In other words, the model defines which variables are contained in the specification. The estimation procedure corrects for any bias that may result. This second approach is used in only two of the studies included here, by Elnicki (1975) and Sloan and Steinwald (1980).

Whichever approach is used, our selection of studies has been limited to those which have avoided the most obvious sources of bias that can result from pooling cross-section and time series data.

Hospitals in America and Canada compared

In this section we explore how far the experience of prospective incentive schemes in America is transferable to Canada, and vice versa. Would identical schemes have had a qualitatively similar impact? Before answering this question we shall explore the implication of a potentially fundamental difference between schemes in the two countries, particularly if Ontario's scheme is typical of the rest of Canada.

In particular, American prospective incentive schemes reviewed cover only a fraction of hospital income, although occasionally the fraction may be as large as 80 per cent or more (Bauer, 1978, Tables 1 and 2). The only exception is the Economic Stabilization Program. In Ontario, prospective reimbursement effectively covered all hospital income. The significance of this distinction is that in Ontario, hospitals would unequivocally aim to contain costs if they wished to improve their financial position in the short run. In America, however, often the major part of hospital income is paid retrospectively; that is, actual expenditure plus some given proportion of actual expenditure which may be as high as 5 per cent (May 1971, 51). Thus, though prospective reimbursement encourages hospitals to contain costs, retrospective reimbursement encourages them to do the opposite.

Davis (1973) has recognized these opposing tendencies and estimated how important prospective reimbursement must be as a proportion of total hospital income if its incentives are to dominate and costs be contained. Her estimates are based on two different hospital goal hypotheses: profit maximization, and output maximization subject to a break-even constraint. She also assumes that retrospective reimbursement offers a 5 per cent surplus or thereabouts. Whatever might be said about the reality of the goal hypothesis, the cost-plus proportion is not very different in magnitude from actual practice. Using these hypotheses and the assumption, Davis estimated that so long as from 5 to 10 per cent or more of hospital income were paid prospectively, then hospitals would tend to contain costs. The proportions of hospital income paid this way in the individual schemes reviewed all exceed this limit by a large margin.

The above result is strongly suggestive that, if schemes still failed to contain costs, then either their design had been at fault or we are mistaken in our assumption about the hospitals' goals. Our review of individual schemes suggests that when schemes failed it was their design that

was at fault. Knowledge of the method of reimbursement for alternative sources of income would help predict the magnitude by which prospective reimbursement contained costs. None of the studies reviewed allow this prediction to be made.

The American and Ontario schemes, therefore, both offer incentives to contain costs. We now explore two possible differences that may modify this prediction. The first considers the basic issue of the importance of the financial target. The second explores the relationship between hospitals and the doctors that work in them.

We show in Part II that financial targets mattered to those who ran hospitals in America. Are financial targets likely to be as important in Canada? To answer this question, we shall distinguish between the short and the long run, using this distinction to consider why financial targets are likely to matter in both jurisdictions. In the short term they matter because hospitals can become insolvent and therefore risk closure. In America this has been the experience of some; and in New York City the scale has not been trivial (Ruchlin and Rosen, 1980, Table 7).

It would seem improbable that hospitals in Canada, if Ontario's experience is anything to go by, risk closure for this reason. Governments in Ontario have, from time to time, tried to close particular hospitals, but the choice of hospitals has been dictated not by their financial viability but by the application of province-wide bed norms to particular hospital centres which are defined on the basis of natural catchment population. In Ontario, 155 such hospital centres were defined. The provincial governments might have caused hospitals to close through insolvency and still have achieved uniform bed provision if hospital budgets had been allocated to the hospital centres. But this degree of decentralization has proved unacceptable. Instead, each hospital has its budget set by the provincial Ministry of Health, and efforts to close hospitals in particular locations require a conscious exercise of political will, which has been largely absent in sufficient quantities to date.

The spectre of closure through insolvency may be slight in Canada, but financial targets could still matter as much here as in America over the longer term. An assumption of this study is that those running voluntary hospitals in North America have sufficient ambition to wish them to continue operating in the long term, and some may even wish their hospitals to grow. Thus, at the very minimum hospitals must finance capital expenditure to make good wear-and-tear and obsolescence. Their financial re-

quirements will be larger still if they wish to expand. Finance can come either internally by generating net income, or externally by borrowing or from private philanthropy and public grants.

Comparisons between America and Canada on the sources of capital finance are based largely on the incomplete information given in chapter 1. What we seek to establish here is the extent of public finance in the two jurisdictions. Insofar as there are differences in magnitude, then hospitals in one jurisdiction would have to rely more or less on their own resources. Internal finance, by generating net income, is one obvious source; and the ability to generate net income would have the added advantage of facilitating external finance by borrowing. Nowadays, few voluntary hospitals can rely on philanthropy to fill the gap left by public grants (Manley and Ashby, 1977). Thus, hospitals which have less access to public grants would be under a greater incentive to rely on their own resources to meet their financial target over the long term.

In chapter 1 we showed that public finance can come from all levels of government, and that it can be given directly by reducing the cost of the capital outlay or indirectly by reimbursing part of the interest payments and depreciation that are associated with the capital outlay. We begin with the federal levels of government.

In America, direct federal government finance of capital projects to provide patient care facilities largely disappeared with the termination of the Hill-Burton program in 1974. In Canada, it disappeared entirely with the termination of the Hospital Construction Grant in 1970. Indirect federal government support has continued in America through the policy of reimbursing its share of the interest charges and depreciation associated with the Medicare and Medicaid programs. In 1975, 57.4 per cent of hospital recurrent expenditure was financed from public funds, of which Medicare and Medicaid contributed 22.1 per cent and 8.6 percentage points respectively (Gibson and Fisher, 1979, Table 5). If the remainder of public funds had been paid to federal, state, and local government hospitals, then something like 40 per cent of the voluntary hospital income came from these two federal programs. The proportion of their capital program indirectly financed this way would have been similar. (In addition, some Blue Cross plans supported capital expenditure in much the same way). In Canada, indirect federal government support has been minimal. Capital expenditure on land, buildings, and physical assets was not allowable under HDSA. Depreciation, but not interest charges, was

allowable only for moveable equipment which is specific to hospitals, such as is used for radiology. Since 1977, federal support under HIDSAs has been in the form of a block grant with no explicit indirect support for capital expenditures.

Public finance at the state and local government levels (in America) and at the provincial and municipal government levels (in Canada) is provided at the discretion of these governments, within certain limits. Such information as we have on its provision is fragmentary. In America, it would seem that public non-federal finance is available only for state and local government hospitals. Voluntary hospitals therefore hardly benefit at all. In Canada, provincial governments had to conform to the federal Hospital Construction Grant program until its termination in 1970. Since then, provincial governments have made their own arrangements. Previous differences (McCracken 1969, Appendix 1) are likely to have continued. Ontario is the province we know best. There, in the mid-1970s, the provincial government gave direct finance to cover two-thirds of the cost of construction and related equipment, and indirect finance to cover depreciation but not interest charges for the whole of medical equipment if the latter were eligible for depreciation.

In conclusion, taking into account direct and indirect funding by all levels of government, public finance in the mid-1970s would seem to have been rather more generous in the Canadian province of Ontario than in America as a whole. Thus, not only did voluntary hospitals in Ontario face less risk of bankruptcy, but public finance to ensure their long-run viability and growth would seem to have been more readily available than for corresponding hospitals in America. To that extent, financial targets may have been taken less seriously in Ontario than in America.

Finally, we shall explore what difference the relationship between hospitals and the doctors who work in them may make to the effectiveness of prospective incentive schemes. Pauly and Redisch (1973) have developed a model of the hospital in which the hospital is viewed as the physicians' workshop and the maximand is physician income. Their model is based on the experience of American hospitals. They assume that hospitals and physicians compete for the individual patient's ability to pay and conclude that what is paid to the hospital is therefore not available for the physician. The authors recognize that third-party payment (as opposed to direct payment by patients) tends to reduce the competition between hospitals and physicians. When there are separate funds to

reimburse hospital and physician, as for example from Blue Cross and Blue Shield, the competition between them is reduced still further. In the time since the Pauly/Redisch paper was published, it has become clear that direct payments from patients have contributed only a small fraction of hospital income in America. In recent years (c. the 1970s) the proportion was about 5 per cent of all age groups - under 19 years, 19 to 64, and 65 and over (Gibson and Fisher, 1979, Table 5).²

At the time Pauly and Redisch's study was published the major proportion of hospital income would have come from third parties, such as Blue Cross, Medicare, and Medicaid. Most importantly, hospitals would have typically been paid by them on a cost reimbursement basis. Thus the predicted competition between hospitals and doctors had an even weaker basis, at least when applied to the individual patient's ability to pay. Since that time prospective reimbursement has become more common, and some of the predicted competition may now be present. Whether or not it is depends on the willingness of doctors to respect the financial targets set by hospitals and to modify their behaviour accordingly. Thus they might lengthen stay if the targets are set in terms of per diem costs.

What Pauly and Redisch seem to have overlooked is that physicians provide hospitals with patients. In America this has several advantages for the hospital's financial position. More patients usually means lower unit costs, which in turn increases the hospital's ability to attract those patients who must pay the hospital's charges directly. Patients whose charges are paid by third parties are also a source of income to hospitals. The lower the unit costs, the larger the net income (revenue minus expenditure) per patient when payment is prospective. Net income per patient will be lower when payment is retrospective, but there will be more patients and total net income may increase too. Thus, whatever way the hospital is paid in America - prospectively or retrospectively and by patients or third parties - the more patients its medical staff admits, the larger its net income is likely to be.

If Ontario's experience is anything to go by, the situation described above for America is very different in Canada. In Ontario, physicians generate expenditure rather than income for the hospital. Only for part of the period from 1969 to 1975 did physicians also generate income for the hospital, by admitting more in-patients and treating more out-patients. Competition between hospitals and doctors who work in them for the funds available to pay them both is, as predicted by Pauly and Redisch, more

likely to have been experienced in Canada than in America.

A possible taxonomy of prospective reimbursement

The fourth and final topic covered is the definition of those features in the design of prospective reimbursement schemes that are likely to be important if costs are to be contained. The (American) Health Care Financing Administration identifies seven. They are as follows:

1. All hospitals within a given system should submit accounting and reporting data based on uniform systems.
2. Health planning and rate setting should be closely coordinated.
3. Prospective rate setting systems should focus on total hospital expenditures including utilization factors.
4. Prospective rate setting systems should cover all payers.
5. Hospital participation in rate setting systems should be mandatory.
6. Statistical screens should be established to determine what hospital costs are reasonable.
7. An appeals or exceptions process should be created to allow hospitals the opportunity to rectify what they believe to have been an inappropriate decision (Health Care Financing Administration, 1977, 3-4).

Information on all seven features is not available for the individual schemes reviewed here. However, all but number 2 can be covered, directly or otherwise. The remaining six are briefly discussed. Feature 5 states that 'hospital participation...be mandatory'. The American Hospital Association, Report on Budget/Rate Review Programs, 1978, makes a further useful distinction, and differentiates schemes set up by state legislatures from other, voluntary schemes (General Accounting Office, 1980, 29). Use is made of this twofold distinction in this study. Thus we would expect state-legislated schemes to require hospital participation. The New York scheme set up in 1970 is such an example. But other, voluntary schemes may or may not require hospital participation. One that does is the scheme set up in 1950 in West Pennsylvania by Blue Cross. One that does not is the scheme set up in 1969 in Connecticut by the Connecticut Hospital Association. These three and two other schemes are studied in Chapter 6.

Features 1, 6, and 7 are also covered in our review to the extent that we know how the approved budget is determined - by the review of the individual hospitals, by applying a formula common to a group of hospitals, or through some other way.

Features 3 and 4 are covered by identifying the financial implications of prospective reimbursement in the short term (within one year usually) and long-term (subsequent years). Is there a conflict between the short and the long terms?

NOTES

- 1 It is used by Zimmerman et al. (1977) to evaluate the Rhode Island scheme.
- 2 There is conflicting evidence of the actual magnitude of direct payments. More recent estimates, which do not give an age breakdown, suggest the proportion has been around 10 per cent in the 1970s (Gibson and Waldo, 1981, Table 5). Even a discrepancy of this magnitude, however, shows that patients nevertheless paid directly only a small fraction of hospital costs.

PART II

THE AMERICAN EXPERIENCE

Part II is given over to a review of the varied experience of prospective reimbursement in America. The Economic Stabilization Program is included since in essence it introduced prospective reimbursement from its very beginning by freezing wages and prices. The Program's impact is evaluated in Chapter 3. This is followed by a review of studies evaluating individual prospective schemes, but on a nationwide basis. The complexity of such schemes is necessarily simplified and full advantage was not taken of the taxonomy defined in Chapter 2. Nevertheless, convincing conclusions of the impact of individual schemes and some estimates of their magnitude can be found. This material is reviewed in Chapter 4. The review of nationwide experience is followed in Chapter 5 by a review of prospective incentive schemes in four jurisdictions: Connecticut, New York State, Rhode Island, and West Pennsylvania. Much fuller information is available on the individual schemes than can be found in the nationwide evaluations, and their inclusion puts flesh onto the bare bones of the latter.

Some or all of the individual schemes have already been reviewed by Bauer and Densen (1974), and more recently by Chassin (1978), Hellinger (1978), and Salkever (1979, Chapter 4). The last three have the advantage of statistical evaluations not available to Bauer and Densen. We believe, on the evidence to be presented, that Chassin is too ready to dismiss prospective reimbursement as a means to contain costs. We also believe that we can generalize, more than Hellinger does, on what features contribute to the effectiveness of prospective reimbursement as a means to

contain costs. Salkever's review is well worth reading. However, he omits two schemes - Connecticut and West Pennsylvania - reviewed here. In addition, we are more specific about which features of prospective reimbursement have been important and make a variety of other points not covered in his review. Our overall conclusions are, however, the same. We believe hospitals have financial objectives, and their behaviour can accordingly be modified.

In Part II our primary concern is to infer the existence of financial objectives from hospital behaviour. But if prospective reimbursement is to contain costs it is also necessary to set tough financial targets. The design of schemes is likely to reflect the ability and willingness of those running the schemes to do so. In Part II we also explore which of their features were found to be most successful in containing costs.

THE ECONOMIC STABILIZATION PROGRAM

The Economic Stabilization Program was in operation from August 15, 1971 to April 30, 1974. In this chapter we first describe the program and then review evaluations of its impact on hospital performance in respect of in-patient costs and bed use.

Description¹

The federal program covered the whole economy for its duration and, in many respects, hospitals were subject to similar if not identical conditions as elsewhere. These similarities are identified where possible.

The program began (Phase I) with a ninety-day freeze on all prices and wages. Hospitals were subject to the same conditions as the rest of the economy. Charges for patients paying directly were frozen. The major part of hospital revenue came, however, not from patient charges but from third-party cost reimbursement. Unit service costs, i.e., the cost per man-hour, were frozen, but not the volume of their employment. The program had introduced prospective reimbursement for hospitals on a national scale, but not control over their total revenue from cost reimbursement.

Phase II started on November 14, 1971, but the hospitals' guidelines were not defined until December 30, 1971. Again they were similar, if not identical, to manufacturing and the rest of the economy. They were identical in respect of the service cost inflation targets, which were set at 5.5 per cent for wages per annum and 2.5 per cent for other costs. No increase in the hospital's ratio of net revenue ('revenue minus operating expenses minus depreciation') to total revenue above its base year level was permitted.

In other respects, the targets set for service costs were different

from or at least not necessarily the same as elsewhere. Thus hospitals were exempt from the downward adjustment to reimbursable cost arising from industry-wide (i.e., hospital-wide) increases in productivity. Hospitals were exempt because of the difficulty of deriving sensible measures of changes in their productivity. Hospitals were also allowed to increase total expenditure on new technology by 1.7 per cent per annum. The levels set elsewhere are not known. That set for hospitals had an arbitrary basis. It was set to allow unit service costs to rise by up to 6.0 per cent per annum, a level chosen as being one-half the increase in per diem costs experienced about that time.

All the above-mentioned guidelines for Phase I and the early part of Phase II refer to service costs. It was not until September 13, 1972 that an index incorporating patient cost targets was published. This was subsequently amended, although the general principles remained unchanged. The final form of the patient cost target, combining the service cost targets, was published in April 1973 and was, therefore, only operational for one year before the termination of the program.

The program differed from most if not all other prospective reimbursement schemes then in operation by having a patient cost target defined in terms of more than one dimension. The program's patient cost target took into account cost per case, cost per diem, and cost per outpatient. Cases and patient-days were given equal weight. The index, combining the three dimensions of patient costs, was permitted to increase by up to the permitted increases for service costs and, in addition, by a further 2 per cent per annum. This extra 2 per cent allowed input intensity, i.e., services per patient or per diem, to increase and, combined with the 1.7 per cent increase in services for new technology, matched the increase in input intensity per case experienced about that time. Input intensity per diem had been increasing at a faster rate, so the patient cost target aimed at slowing down its rate of increase. Hospitals were permitted to avoid the patient cost target by developing service cost targets of their own, but few chose to do so.

Medicare set up a similar scheme about this time. The sources referred to do not indicate at what date during Phase II it came into operation. The target set by Medicare suggests that it came into effect on or after September 1972, when the patient cost target was first publicly indicated. The cost targets of the Medicare scheme and the program can be distinguished in two respects. First, the Medicare scheme, unlike the

program, had no service cost targets. Nevertheless, the target set by Medicare implicitly adopted the various norms set by the program, and allowed patient cost inflation of 9 per cent per annum. Second, the Medicare scheme differed by having a single dimension of patient costs and per diem costs, and not a composite of the three.

It is not clear how rigorously the program was administered. For example, throughout its duration hospitals could give the low-paid increases in excess of the norm. However, their reimbursable costs were not automatically raised by a corresponding amount. This is only one example of the discretion exercised by those administering the program. There were two other gateways for avoiding the targets, but states differed in their interpretation of them, 'widely' according to Ginsburg (1976b, 39). Eventually, exemptions were usually given only if this helped the hospital avoid being in deficit and avoid the risk of bankruptcy. This gateway, however, was virtually an automatic condition for exemption. Hospitals exempted from the program's targets were also exempted from the Medicare limit to per diem cost inflation.

Ginsburg (1976b, 50) suggests that the ability of the program to contain costs may have been frustrated in other ways as well. For example, some hospitals probably had no difficulty keeping within the limits set. But by setting limits at all, hospitals would have been forewarned of financial difficulties to come. These hospitals might, quite reasonably as it turned out, have raised their level of current expenditure by the permitted amount to better secure its level in the future.

In conclusion, during Phase I limits were set to service cost inflation but not to patient cost inflation, except insofar as service cost inflation was controlled. During Phase II new and higher limits were set for service cost inflation and, for about the final year-and-a-half, limits were set to patient cost inflation too. These incentives to contain costs would, however, have been modified by the exemptions offered to some hospitals and by counter-productive responses from others. The next section reviews the evidence for the impact of the program on hospital costs and bed use.

Evaluation

We begin by spelling out the predicted influence of the program on hospital costs, and its consequent implications for changes in bed use. The

program is evaluated for its impact on both these dimensions of hospital performance.

The program set targets for wage and price inflation for the economy as a whole. These services cost targets for hospitals were similar to those set for the rest of the economy. Often they were identical. Therefore, there was no a priori basis for the program to have had a different impact on the hospitals than elsewhere. This is obviously true in respect of hospital service cost inflation. We believe it is also true for patient cost inflation. Evaluations of the program which compare hospitals with the rest of the economy should be interpreted accordingly. The absence of an observed correlation could simply mean that the program had a similar impact on hospitals as elsewhere. Beginning September 1972 controls over the increase in unit patient costs were also introduced. These might be expected to have contained unit patient costs as compared with prices in the rest of the economy.

Control over patient cost inflation depended on controlling service cost inflation, the growth of input intensity and the introduction of new technology. The targets set for service cost inflation were separately enforced from those set for patient cost inflation. Controlling patient cost inflation therefore depended primarily upon controlling the growth of input intensity and the introduction of new technology.

There was little that those running hospitals could have done to avoid the service cost targets unless they had been granted an exemption. Otherwise they would have faced the financial penalties that go with prospective reimbursement. Patient cost targets, on the other hand, were easier to achieve, although the means to do so under the program were limited. There were notional limits to the growth of input intensity and the introduction of new technology. However, measured patient cost inflation could have been modified by improving allocative and X-efficiency or, more plausibly, by altering bed use. The three-dimensional basis of the program's index of hospital costs would have created some difficulty in knowing how best to alter bed use. But if hospitals increased admissions with, preferably, patient stay constant then per case and per diem costs would both have fallen. Any other response, say, to have increased patient stay, would have caused a second dimension of costs to have risen and the net outcome for the hospital's index of costs would then have been uncertain. Much to be preferred from the hospital's point of view is the predictable fall following from an increase in admissions, with patient stay

constant. Hospitals, of course, may have been distracted from perceiving the advantage of increasing admissions by Medicare's emphasis on per diem costs.

In conclusion, in the period from August 1971 to September 1972 no prediction is made of the movement of hospital costs vis-à-vis the economy as a whole. In the period from September 1972 to April 1974 it is plausible to predict that the program reduced patient cost inflation to a greater extent than elsewhere in the economy. During this latter period we predict that admissions increased and that patient stay remained unchanged. If patient stay also increased this is likely to have been due to the unambiguous per diem cost target set by the Medicare scheme. Evidence to test the two sets of predictions is now presented, first for bed use and then for patient costs.

Evidence of the impact of the program on bed use comes from two sources. One source gives evidence in support of the predicted impact; the other does not. The differences are largely resolved in favour of the former: namely, that the program did alter bed use in the manner predicted.

Ginsburg (1978) uses a sample of nine census divisions and pools quarterly data for the period 1963 II to 1973 II. The program is identified by a binary variable for the quarters it was in operation. Ginsburg finds that length of stay shortened between 1971 II and 1973 II, and that admissions were unchanged. Thus neither of the above predictions is confirmed, either for the whole duration of the program studied or for that part beginning 1972 IV when the patient cost targets were introduced.

The second source is Sloan (1981, Table 2) who uses state data as his sample, and pools the annual series for the period from 1969 to 1978. Sloan does not specifically identify the years when the program was in operation. Instead, each of the ten years is represented by a set of binary variables. This makes it more difficult, though not necessarily impossible, to identify whether, for the duration of the program, long-term trends in bed use were reinforced, opposed, or unaffected.

The shortening of patient stay for part of the duration of the program (1971 II to 1973 II), found by Ginsburg, is found by Sloan to have been part of a trend lasting at least from 1969 to 1978. The negative correlation between patient stay and the program found by Ginsburg is thus likely to be spurious, as he admitted himself could well be the case.

Sloan also finds evidence that the decline in admissions was largely

halted during the program's lifetime. In the period studied by him, 1969-78, the beginning of the decline in admissions can be traced to 1971. Between 1971 and 1972 admissions fell by 1.4 per cent. In the next two years, when the patient cost targets were in operation, admissions fell by only 0.3 per cent and 0.2 per cent. Thereafter, the decline in admissions increased to 2.2 per cent, 1.8 per cent, 3.3 per cent, and 2.6 per cent per annum, up to 1978. This erratic movement of admissions is consistent with the predicted response to the program's patient cost targets, especially as bed supply hardly changed at that time.

Evidence of the predicted response to the program for bed use suggests that hospital costs would respond in the predicted fashion as well. Salkever (1979, 155-60) has reviewed five studies evaluating the program and concluded that there was little agreement between them about the impact on containing costs. We also review them and one other published since then. We conclude that the disagreement is largely explained by the method of evaluation, and that costs were indeed contained, as predicted.

The six studies are a mixed bag. By far the most comprehensive for the range of hospital behaviour is studied in Ginsburg (1978). But, as stated above, this study is deficient through covering the period only up to June 1973. Two other studies are also directly concerned with the program (Sloan and Steinwald, 1980; and Sloan, 1981), although only insofar as but one of several types of regulation used to control hospital costs. The chief virtue of these two studies is that they cover the whole duration of the program as well as afterwards. The three remaining studies evaluate the program indirectly (Feldstein, 1977; Lave and Lave, 1978; and Salkever and Bice, 1979). They, nevertheless, have some comments to make on the impact of the program on unit patient costs.

Until September 1972, the program would only be expected to have influenced patient costs through its influence on unit service costs. Thereafter, input intensity and bed use might have been modified with consequent effects on patient costs. Evidence given above suggests that bed use was indeed modified by the program. As explained in chapter 3, the identification of an impact for its influence on unit costs from the model of unit costs. The lack of agreement noted by Salkever in his review of five studies finds a ready explanation in the different models used.

Models that cover the period up to 1972 should omit prices if the

impact of the program is to be identified. Only Lave and Lave (1978) make this omission. Not surprisingly, they produce evidence that per diem and per case cost inflation were reduced. Those studies covering a later period should also omit input intensity and bed use from the model. Only Sloan and Steinwald (1980) and Sloan (1981) do so, and again they find that the program lowered per diem and per case costs. The absence of any identifiable impact in the three other studies indicates that the program did not have a significant impact on allocative or X-efficiency. That absence may in turn be explained by the limit to allowable net revenue which might more easily be attained by other means.

We have not used these studies to estimate how much the control of service cost inflation contributed to the reduction in patient cost inflation. Indeed, it is doubtful if any of the studies allow this estimate to be made. They do, however, permit the estimation of the combined impacts of adjustments to input intensity and bed use. Their separate contributions cannot be estimated. Two studies are used as sources.

The first study, by Sloan and Steinwald (1980), is of annual data on a sample of 1,228 short-term hospitals for the period 1970 to 1975. The program is measured by a continuous variable whose value lies in the range from 0 (did not exist that year) to 1 (existed for 12 months of that year). The authors found that, when the program was in operation a full year, per diem costs were reduced by 0.6 per cent in that year, and by 0.9 per cent in the longer term. The corresponding data for per case costs are 0.7 per cent and 1.2 per cent.

The second study, Sloan (1981), has already been referred to above in the context of the impact of the program on bed use. The sample studied is the same, but the period covered is from 1963 to 1978. The program variable takes values between 0 and 1, depending on the proportion of the year in question during which it was operational. A variety of specifications are reported and all, again, show that unit patient costs were lower when the program was in force. Nevertheless, all estimates of the impact of the program are higher, by an order of magnitude, than those found in Sloan and Steinwald (1980). The second study indicates that, if the program had been in operation a full twelve months, then within one year per diem and per case costs would have been lowered by from 2 per cent to 3 per cent. Over the longer term unit costs could have been reduced by as much as 10 per cent. Sloan participated in both studies but makes no comment on the different orders of magnitude. It is

worth noting, however, that the two studies differ in respect of the samples and periods studied, and in the methods of estimation used to correct bias due to the pooling of cross-section and time series data.

The second study analyses patient cost inflation as well. The model used is identical to that applied to changes in bed use described above. The impact of the program must be inferred from the behaviour of cost inflation year-by-year between 1969 to 1978. A variety of influences other than those due to the program may account for the magnitude of the estimates. Taking the period as a whole, per diem cost inflation is estimated to have increased between 1970 and 1971 by 1.8 percentage points over the previous year. It is also estimated to have increased marginally the following year by 0.5 percentage points. Thereafter, it declined by 4.2 per cent and 5.4 per cent in consecutive years. Per case cost inflation fell continuously by 1.3 per cent between 1970-1 and by 0.9 per cent, 5.1 per cent, and 7.1 per cent in consecutive years. The program was in operation between 1971-4, and patient cost targets were set at the end of 1972. This coincidence of patient cost targets and the change in per diem and per case cost inflation is further evidence that the program contained costs to some extent.

Summary and Conclusions

The federal Economic Stabilization Program was introduced in August 1971 and lasted until April 1974. At first it imposed wage and price controls, and the levels set for hospitals were similar if not identical to those imposed for the rest of the economy. In late 1972 patient cost targets were imposed and these affected patient cost inflation over and above any changes in wages and prices.

The set of dimensions used for the patient costs targets predicts that the most certain way to avoid them, in respect of bed use, would be to increase admissions, so long as length of stay remained more or less constant. There is evidence that hospitals responded in the predicted manner. For these and possibly other reasons, per diem and per case cost inflation were reduced for that part of the duration of the program when patient cost targets had been imposed. No attempt is made to estimate how far the program had reduced prices and wages in general or for the hospital sector in particular.

NOTES

- 1 This chapter draws heavily on Ginsburg (1976b; and 1978, 295-301). The interpretation given to them, though, is our own.

As many as 27 states are identified as having had prospective incentive schemes of some sort in 1978 (General Accounting Office, 1980, Appendix III). The studies reviewed in this chapter evaluate the schemes on a nationwide basis. The studies reviewed in the following chapter evaluate some of the schemes on an individual basis. The majority of schemes have been designed with their financial targets expressed in terms of per diem costs or per diem cost inflation (Salkever, 1979, 123), though this situation may be changing now. The five schemes reviewed in the following chapter had their financial targets expressed in one or another of these dimensions. The chief purpose behind our study of American experience is to identify whether hospitals have financial targets. If per diem costs or per diem cost inflation are set as targets, the appropriate hospital response would be to alter one or the other as appropriate. Four of the seven studies reviewed in this chapter evaluated projective reimbursement in just this way. These four are the first ones reviewed.

The three remaining studies are included for their evaluations in terms of cost per case and of expenditure. It is not possible to infer unequivocally from a knowledge of the change in the above cost per case or expenditure how per diem costs responded. Nor is it possible to predict how cost per case or expenditure would change in the face of per diem cost targets. Nevertheless, the primary purpose of the financial targets has been to contain expenditure. It is worth recording whether in fact they did so, even though this eventual consequence cannot be predicted.

Cost per diem

If most of the schemes had their financial targets expressed in terms of

per diem costs or per diem cost inflation, then per diem costs or per diem cost inflation should be lower at hospitals and in states with such schemes than elsewhere. Four studies analyse the impact of schemes on per diem costs or per diem cost inflation. Coelen and Sullivan (1981) and Sloan (1981) analyse both dimensions of cost per diem; and Melnick et al. (1981) analyse per diem cost inflation only. All four studies also evaluate schemes for their impact on other dimensions of hospital costs. The four studies are now reviewed in turn.

Coelen and Sullivan (1981) draw on a sample of annual data on nearly 2,700 community hospitals, covering the ten-year period 1969-78, to study the impact of a variety of different schemes in fifteen of some thirty possible jurisdictions. Schemes from the fifteen jurisdictions are identified and evaluated for their impact on per diem and per case costs, as well as on expenditure per capita. All three dimensions are analysed in terms of their levels and annual percentage changes. The analyses of per diem and per case costs are hospital-specific; the analyses of expenditure per capita are county-specific.

The same set of explanatory variables is used in the analysis of all six models, and specifically excludes any on the supply side that might be influenced by a scheme, such as bed use. The full impact of the schemes is thus identifiable. Hospitals and counties are identified for the full ten-year period to capture any intrinsic differences, apart from their participation in one of the schemes in the fifteen jurisdictions, not covered by one of the other explanatory variables. The identification uses a binary variable. Hospitals and counties are identified for the duration of the participation in one of these schemes, again by using a binary variable. Each scheme in the fifteen jurisdictions is also identified by a binary variable, but by none of its characteristics. The latter, instead, are described in a set of tables, and their importance must be inferred from the results for the individual schemes.

Indications of a significant reduction in per diem cost inflation are identified for five of the fifteen jurisdictions, varying in magnitude from 1.2 per cent to 6.1 percentage points per annum. All five schemes were mandatory. Nine jurisdictions in all had mandatory schemes. The remaining six had voluntary schemes.

A significant lowering of the level of per diem costs is also identified for the schemes in the five aforementioned jurisdictions, and for schemes in four other jurisdictions. The last four were all voluntary: in two cases

hospital participation was mandatory; in the remaining two it was voluntary. Schemes in six of the fifteen schemes were voluntary, three each for which hospital participation was mandatory/voluntary. Thus, some two-thirds of each of the three different kinds of schemes in the mandatory/voluntary spectrum had a significant impact on the level of per diem costs. The magnitudes of the reductions in per diem costs were: 2.7 per cent, 4.1 per cent, 5.4 per cent, 7.4 per cent, and 10.5 per cent for mandatory schemes; 3.9 per cent and 5.6 per cent for voluntary schemes with mandatory hospital participation; and 4.8 per cent and 6.4 per cent for voluntary schemes with voluntary hospital participation.

To conclude from the above magnitudes that the latter was uncorrelated with the hospital's position in the mandatory/voluntary spectrum would be wrong. The magnitudes reflect the combination of the anti-inflationary impact of the scheme and its duration. If this identity is used, then, with one exception, successful mandatory schemes reduced per diem cost inflation by some 2 to 4 percentage points per annum. Successful voluntary schemes, on the other hand, rarely reduced it by as much as 1 percentage point per annum. These implied estimates for mandatory schemes are smaller than those derived directly for per diem inflation, but the differential between mandatory and voluntary schemes is confirmed. The significant impact of voluntary schemes on per diem costs is because they had been in operation sufficiently long for the cumulative effect of their small anti-inflationary effect to become identifiable.

Sloan (1981) has been referred to already in the context of the Economic Stabilization Program. He analyses prospective reimbursement for its impact on the levels of per diem and per case costs and their changes over time, using state data for the period 1963 to 1979. The same model is used for the analysis of the levels of per diem and per case costs, being a fairly comprehensive set of factors associated with the supply of and demand for hospital care. A considerably simpler model is used in the analysis of their changes over time. However, none of the factors included in either model include any of the five avenues by which prospective reimbursement might influence unit costs, even though the expenditure data are corrected for inflationary trends common to the economy as a whole. Thus, the full impact of the schemes is identified.

Sloan's study concentrates on mandatory schemes and distinguishes young from mature ones. He finds per diem cost inflation was not significantly reduced in the first two years of such schemes. Thereafter it was.

The reduction would have been 3.7 percentage points if all hospital income were covered by a mandatory scheme. Sloan finds similar differential results for the impact on the level of per diem costs. Young mandatory schemes had no significant impact; older ones did. He estimates that if the whole of the hospital's income in the state were covered by a mandatory scheme, then per diem costs would have been lower by some 6 per cent in the short term and by as much as 20 per cent over the long run (Sloan, 1981, 484).

Sloan and Steinwald have also been referred to previously in the analysis of the Economic Stabilization Program. They have an approach similar to that described for Sloan (1981) above. The set of supply and demand variables used to analyse the impact on the levels of per diem and per case costs is much the same, with one important exception. Sloan and Steinwald include the possible influence of prospective reimbursement via the hourly wage rate for 'other' hospital employees in their models of unit costs; whereas Sloan (1981) includes none of the five identified avenues and 70 measures the full impact prospective reimbursement may have had. Three other, arguably substantial, differences between the two studies can be identified. First, individual hospitals and not states constitute Sloan and Steinwald's sample. Second, the period studied is limited to from 1970 to 1975. And third, the influence of prospective reimbursement is extended to include voluntary as well as mandatory schemes. No distinction is made between mandatory and voluntary schemes, nor between their maturity. Instead, the distinction between them is limited to the way the financial target is set, being either by arbitrary formulas or by negotiation. The latter is referred to as 'budget' prospective reimbursement. Hospitals in New York State dominated the experience of hospitals subject to 'formula' prospective reimbursement at that time, and the results may reflect the New York State situation rather than the impact of using formulas to set targets.

Sloan and Steinwald find 'formula' prospective reimbursement had no statistically significant impact on per diem costs. This and other results involving 'formula' prospective reimbursement cannot be accepted with confidence. Sloan and Steinwald (1980, 99) suspect their estimation procedure may not have correctly handled the problem of New York State dominating the set of hospitals paid this way. The authors find, on the other hand, that 'budget' prospective reimbursement is significantly correlated with the level of per diem costs. In particular, if the whole of the hospi-

tal's catchment population were covered by prospective reimbursement schemes, then per diem costs would have been lower by some 3 per cent in the short term and by some 4.8 per cent over the long run (Sloan and Steinwald, 1980, 100).

Melnick et al. (1981) analyse state data primarily for increases in total hospital expenditure between 1975 and 1979. They also analyse the various components of this increase, of which one is per diem cost inflation. The same model is used for all dimensions studied. It includes various explanatory variables capturing differences in market supply and demand. However, none of the five avenues whereby the schemes might have reduced costs are included in the model and so, once again, the full impact of schemes is not measured. States with mandatory schemes are identified and measured by a binary variable. Voluntary schemes are not identified. The authors estimate that per diem cost inflation in states with mandatory schemes was reduced by 2.25 percentage points per annum during a period when the national rate was on average 14.87 per cent.

Comparisons are now made of the estimates of the different studies for their consistency. Already evidence is available that the impact of schemes is usually greater if they are mandatory. Two of the four studies include voluntary schemes as well. In the case of one, Sloan and Steinwald (1980), it is not possible to separate voluntary from mandatory schemes. The comparisons are therefore limited to the three studies for which information on specifically mandatory schemes is available. These three studies evaluate schemes operating more or less over the same period. We begin our comparisons with the results of the two studies for the impact on the level of per diem costs.

The two relevant studies are Coelen and Sullivan (1981) and Sloan (1981). One difference between them of potential significance is that the former analyses hospital data whereas the latter analyses state data. The significance of this difference lies in the possible failure, in the analysis of state data, to take account of non-participating hospitals. Sloan has taken account of this difference. Hence, the estimates from the two studies might reasonably be expected to be of a similar order of magnitude. Coelen and Sullivan find that in the period up to 1978, five of the nine mandatory schemes had a significant impact on the level of per diem costs, reducing them by from 2.7 per cent to 10.5 per cent. Sloan finds that in the period up to 1978, mandatory schemes had no significant impact on per diem costs in their first two years. Thereafter, their within-year

impact was 5 per cent and the long-term impact was as high as 20 per cent. The consistency of the two studies would seem to lie in the diversity of the results each obtains. But that diversity is largely explicable in terms of the duration of schemes. Mandatory schemes seem to have taken a few years to lower per diem costs by a significant amount.

Three studies evaluate mandatory schemes for their impact on per diem cost inflation. Coelen and Sullivan find that five of the nine mandatory schemes are significantly negatively correlated with per diem cost inflation. They estimate that hospitals experienced a reduction varying from 1.2 to 6.1 percentage points per annum in respect of these five schemes for the period up to 1978. Sloan's study of the impact at the state level suggests no impact in the first two years, and then a lowering of per diem cost inflation by some 3 to 4 percentage points thereafter. These estimates are certainly consistent with those given by Coelen and Sullivan. Melnick et al. cover the period 1975 to 1979, one which begins at about the time the mandatory schemes evaluated by Coelen and Sullivan were first implemented. Like Sloan, Melnick et al. evaluate the schemes at the state level and include the experience of all hospitals, and not only of those that participated in the schemes. Melnick et al. estimate that at the state level, hospital cost inflation was reduced by 2.25 percentage points. However, unlike Sloan, Melnick et al. take no account of non-participants. Had they done so the estimate would have been higher. It would probably have been within the range of estimates found in the other two studies.

In conclusion, the evidence of all four studies confirms the predicted response of hospitals to financial targets expressed in terms of per diem costs. Some schemes have been so designed that hospitals have significantly altered per diem costs. The cumulative effect of some (mandatory) schemes has been to reduce per diem costs by as much as 10 per cent within a short period of a few years. And, at a time when per diem cost inflation was 14 per cent per annum, some schemes reduced it at individual hospitals by as much as 5 percentage points.

Cost per scheme

Cost per case is the product of cost per diem and length of stay. The review in the previous section is ample evidence that per diem cost targets can reduce per diem costs. It is also possible that per diem cost targets may result in patient stay lengthening simply to ensure the target is met.

It is not possible, therefore, to predict the impact of schemes on cost per case. This same conclusion applies to the impact on case cost inflation, for identical reasons. This section assesses whether schemes reduced cost per case as well as cost per diem.

A fall in cost per case might also be regarded as reasonable grounds for inferring that per diem costs fell in the face of per diem cost targets. Berry (1976), Sloan and Steinwald (1980), Coelen and Sullivan (1981), Sloan (1981), and Melnick et al. (1981) all evaluate schemes for their impact on per diem and per case costs. None found evidence that conflicts with the above interpretation, although Coelen and Sullivan (1981) find that the impact is not always statistically significant when evaluated in terms of cost per diem and cost per case.

Six studies evaluate the impact of schemes on cost per case, four of which were reviewed in the previous section and two of which are introduced for the first time. The latter two are Biles et al. (1980) and General Accounting Office (1980). Coelen and Sullivan (1981) and Sloan (1981) analyse cost per case and case cost inflation; Sloan and Steinwald (1980) analyse only cost per case; and Biles et al. (1980), General Accounting Office (1980) and Melnick et al. (1981) analyse only case cost inflation. This review begins with the two studies introduced for the first time. They analyse schemes in terms of their impact on case cost inflation. The review then turns to the other studies for their evaluations in terms of case cost inflation.

Biles et al. (1980) make a straight comparison of the national experience of case cost inflation with that at six states with mandatory schemes. The straight comparison means that none of the avenues by which the schemes may influence case cost inflation are in the model of case cost inflation. The period studied is from 1970 to 1978, although they concentrated on the last three years, 1976 to 1978. This is the period when the impact of schemes had been most evident, although several of the six schemes had been in force beforehand. They find the average annual increase in case cost inflation for this three-year period was, on average, 11.2 per cent per annum at the six states with mandatory schemes and 14.3 per cent elsewhere. This difference was found to be statistically significant. The straight comparison suggests that during their most favourable period these mandatory schemes succeeded in reducing the annual rate of case cost inflation by 3 percentage points.

General Accounting Office (1980) also analyses case cost inflation at

the state level. The period covered is from 1975 to 1977. States with schemes of any sort are identified. Mandatory and voluntary schemes are distinguished from each other. Schemes are further classified as 'advisory' when rate regulation is left entirely to the hospitals; otherwise they are classified as 'regulatory' schemes. These two pairs of categories complete the model of case cost inflation. All the avenues by which the schemes may have influenced inflation are once again omitted from the model. The data are analysed by aggregating states to one or the other category. States with no scheme are found to have experienced case cost inflation, on average, of 17.9 per cent per annum over the three years. Corresponding data for states with (a) mandatory/regulatory, (b) mandatory/advisory, and (c) voluntary/regulatory schemes are 13.3, 15.5, and 15.6 per cent respectively (General Accounting Office, 1980, 35).¹

These results strongly suggest that the schemes reduced case cost inflation. The larger impact of mandatory schemes is consistent with results from other studies. Mandatory schemes seemed to have reduced case cost inflation at the state level by 2 to 4 percentage points. Voluntary schemes seem to have reduced it by 2 percentage points. But one should be cautious about inferring a similar causal influence for the regulatory/advisory dichotomy.

The extra-hospital authority that lay with regulatory schemes would seem a promising way to control hospital costs. But the method of evaluation may have resulted in a false impression that this was actually the case. States differed widely in their experience of case cost inflation at this time, a fact masked by the aggregation of their experiences to one or another category. Had the experiences of individual states been compared, then intra-categorical differences might well have swamped the inter-categorical differences found by the General Accounting Office.

We turn next to three previously cited studies for their estimates of the impact of prospective reimbursement on case cost inflation, so that comparisons with Biles et al. and General Accounting Office can more readily be made. Melnick et al. (1981) evaluate mandatory schemes for their impact at the state level. The authors' concern is to evaluate the impact of mandatory schemes. They find that states with such schemes experienced a lower rate of case cost inflation, on the order of 1.3 percentage points per annum for the period 1975 to 1979. The national experience at that time was, on average, 14.2 per cent per annum. The decline in case cost inflation occurred despite a lengthening of patient stay

and a reduction in admissions. Patient stay increased by 0.89 percentage points per annum in states with mandatory schemes, relative to the national decline of 0.44 per cent. Admissions fell by 0.34 percentage points per annum in states with mandatory schemes, relative to the national increase of 1.48 per cent.

Sloan (1981) also evaluates schemes at the state level. His study concentrates on mandatory schemes and, unlike the previous three studies, his estimates take account of non-participation of hospitals. Sloan finds young mandatory schemes had no significant impact, but that schemes two years or older reduced case cost inflation by 3 to 4 percentage points.

Coelen and Sullivan (1981), unlike any of the four previous studies, evaluate schemes of all types for their impact on individual hospitals. Details of this study may be found in the previous section. Suffice it to say that schemes in seven of the fifteen jurisdictions showed significant reductions, varying in magnitude from 1.9 to 4.6 percentage points per annum. Six of these seven schemes were mandatory, of nine such schemes. The single voluntary scheme that required hospital participation was drawn from three such schemes.

Five studies review the impact of schemes on per case cost inflation. All find that, usually, these schemes have had a significant cost containing impact. Two of the studies show that this impact was larger for mandatory than for voluntary schemes. All five studies give estimates for the impact of mandatory schemes. The periods covered are more or less the same, and all five studies exclude avenues whereby the schemes may influence costs from their models of per case cost inflation. Not surprisingly, therefore, the orders of magnitude of the estimated impacts are also similar, especially after correction for differences in the samples studied. Estimates of the reduction in case cost inflation at the state level, with no correction for non-participating hospitals, are in the range of 2 to 4 percentage points. Estimates corrected for non-participation and for individual hospitals are close to 4 percentage points. Finally, comparisons are possible between the impact of prospective reimbursement on per case cost inflation and per diem cost inflation. Three studies give estimates of both. Invariably, the impact was greater on per diem cost inflation, even if the difference was marginal. This difference can largely be explained by the offsetting effect on cost per case of patient stay lengthening in the face of per diem cost targets.

We turn next to the three studies that evaluate schemes in terms of

their impact on cost per case. We begin by returning to Coelen and Sullivan's study. They find that cost per case at individual hospitals was significantly lower in four of the fifteen jurisdictions identified to have schemes of some kind. In three instances, case cost inflation fell as well. The significant reductions in cost per case in the period up to 1978 varied from 4.1 to 8.7 per cent. In each case, the scheme was mandatory.

The mixed results found by Coelen and Sullivan for significant impacts on cost per case and case cost inflation largely reflect the different durations of the schemes evaluated. This point has already been made in the context of their study of per diem costs. Thus, schemes in jurisdictions which had a significant impact on cost per case and case cost inflation had been in operation for 3 and 4 years up to 1978. But those that had a significant impact on case cost inflation alone had been in operation for 1, 2, and 3 years, up to 1978. Short duration, however, is not the explanation for the absence of a significant impact from schemes in the remaining eight jurisdictions. They had been in operation 3, 4, 5, 5, 6, 8, 8, and 10 years respectively. Schemes in five of these eight jurisdictions also failed to reduce per diem costs or per diem cost inflation. Their failure to reduce case costs is thus more of a reflection of the poor design of these schemes than of the offsetting effect of patient stay lengthening in the face of a per diem cost target. Three of these five schemes were drawn from the nine mandatory schemes, and one of the two voluntary schemes was drawn from the three that required hospital participation.

Sloan and Steinwald (1980) also evaluate prospective reimbursement schemes for their impact on individual hospitals. But, unlike Coelen and Sullivan, no distinction is made between mandatory and voluntary schemes. Perhaps for this reason this is the only study to find that prospective reimbursement did not significantly reduce cost per case. Indeed 'formula' prospective reimbursement, associated with New York State, is positively correlated with the level of cost per case.

The study by Sloan (1981) is more encouraging for the impact of prospective reimbursement on the level of unit costs. In his study of mandatory schemes at the state level no impact is identified for their first two years. Thereafter, if all hospital income were financed this way, then within one year per case costs would have been lowered by some 3.5 per cent and in the long run by up to 10 per cent.

If comparisons of the evaluations on cost per case are kept to manda-

tory schemes, then some consistency is found. Mandatory schemes can reduce costs, but they tended to take some time to do so. The reduction in case costs cannot be predicted from per diem cost targets, and this may explain why it was not a common experience. Finally, mandatory schemes had a larger impact than voluntary ones.

Total expenditure

Expenditure is the product of per diem costs, patient stay, and admissions. As noted in the previous section, one cannot predict the impact of per diem cost targets on the product of the first two terms, cost per case. Nevertheless, all the evidence shows that if case costs then they tended to be contained. Nor can we predict how admissions would change in response to per diem cost targets. They may increase, to allow per diem costs to fall, and so that patient stay can remain unchanged. This was, of course, the response to the Economic Stabilization Program. But the program had patient as well as patient-stay cost targets. Alternatively, admissions may decrease as the consequence of lengthening patient stay in the face of a fixed bed supply. If the response of admissions to per diem cost targets is small relative to changes in cost per case, and Melnick et al. (1981) suggest it could be, then a fall in expenditure is prima facie evidence that per diem costs also fell. If expenditure fails to fall, per diem costs may, nevertheless, have fallen. These inferences apply to total expenditure and to its change over time.

Three studies evaluate the impact of schemes on total hospital expenditure. Coelen and Sullivan (1981) and Melnick et al. (1981) have been referred to already. Congressional Budget Office (1976b) is introduced for the first time. Coelen and Sullivan (1981) analyse total expenditure and its change over time; and Melnick et al. (1981) and Congressional Budget Office (1979b) analyse only its change over time. We first review Congressional Budget Office (1979b).

The study by the Congressional Budget Office is of changes in state per capita expenditure over the period 1976 to 1978. States with mandatory schemes are distinguished from those with voluntary schemes. A few other explanatory variables are included in the model, two of which are of special interest. They separately quantify differences in hospital participation on a statewide basis, one each of which identifies mandatory and voluntary schemes. None of the explanatory variables include an avenue

by which the schemes might reduce expenditure so that the full impact of schemes is measured.

State-legislated mandatory schemes are estimated to have reduced the growth in per capita expenditure by 3 percentage points in 1977 and by 3.6 points in 1978 if all hospitals in the state participated in the scheme in 1976. The corresponding estimates for voluntary schemes are 1.2 and 1.9 per cent respectively, but in neither instance are they statistically significant unless a one-tail test is used.

The two other studies also evaluate schemes for their impact on the growth in expenditure. These results are now presented. Melnick et al. (1981) study the impact of mandatory schemes at the state level, uncorrected for the extent of hospital participation. They find that, over the period 1975 to 1979, the increase in total expenditure was reduced on average by 1.69 percentage points per annum. This reduction was achieved partly through a relative reduction in the increase in admissions. Nevertheless, there was a relative lengthening of patient stay. The national experience was for hospital expenditure to increase on average by 15.98 per cent per annum. The impact of schemes was, therefore, to contain the increase in total expenditure to a small but significant degree. Melnick et al. report estimates of the impact on increases in total expenditure for each year in the period covered. They indicate increases were reduced by 0.3, 0.3, 1.2, 2.0, and 1.3 percentage points for the years 1975 to 1979, respectively.

Coelen and Sullivan (1981) analyse schemes for their impact on per capita expenditure at the county, not hospital level. Significant reductions are identified for schemes in four of the fifteen jurisdictions. All four schemes were mandatory. They had been introduced in 1975 or sometime thereafter. In their assessment up to 1978, the increase was reduced by from 3.1 to 4.1 percentage points per annum.

Again the three studies give consistent results, this time for the growth in expenditure. Again, all three cover much the same period, and all three omit the various avenues through which schemes might have influenced expenditure. The chief difference between the models of changes in expenditure is the inclusion of measures of the extent of hospital participation at the state level in Congressional Budget Office (1979b), and their omission from Melnick et al. (1981) and Coelen and Sullivan (1981). The estimates of 3 percentage points for 1977 and 3.6 per cent for 1978 found by Congressional Budget Office for states with

mandatory schemes are based on the assumption that all hospitals in the state participated. Estimates at the state level with mandatory schemes for these two years found by Melnick et al., of 1.2 and 2 per cent, recognize that some hospitals actually did not participate. Coelen and Sullivan have estimates in the range of 3 to 4 per cent per annum, but these were for mandatory schemes in only four of the nine jurisdictions. The remaining five had no statistically significant impact. Congressional Budget Office and Coelen and Sullivan both find that mandatory schemes had a larger impact than voluntary ones. In the latter case there is only weak evidence that the increase in expenditure was reduced at all.

Coelen and Sullivan (1981) is the only one of the seven studies reviewed which evaluates schemes for their impact on the level of (per capita) expenditure. Expenditure is evaluated at the level of the county. Only at two of the fifteen jurisdictions was the level significantly reduced, by 5.1 and 7.6 per cent. Both schemes were mandatory and had been in operation for three years. Their rate of increase in expenditure had also been significantly lowered, as had that for two other schemes. The failure of the latter to significantly lower the level of expenditure is not explicable in terms of their short duration, as they had been in operation for 3 and 4 years.

This completes our review of the impact of prospective reimbursement for its impact on six dimensions of hospital costs and expenditure.

Summary and conclusions

We have drawn on seven studies evaluating prospective reimbursement schemes on a nationwide basis. There is strong evidence that per diem cost targets reduced the level of per diem costs and their rate of growth. Per case costs and their rate of growth were often also reduced, although this result cannot be predicted from the behavioural response of hospitals to per diem cost targets. A similar situation applies to the level of hospital expenditure and its change over time. The choice of model specification in all seven studies allows the full impact of schemes to have been measured.

The marked reduction in costs often occurred during the simultaneous operation of the Economic Stabilization Program. Although many schemes were introduced after the termination of the program, some had not been, and the evidence is consistent with their having had an additional, non-trivial impact.

Most of the schemes evaluated were mandatory, in the sense that they were state legislated. Other, voluntary schemes are also found to have reduced per diem and case costs and hospital expenditure, although by less than mandatory schemes. Finally, there is some evidence that mandatory schemes had no impact in their first two years, but did so thereafter. Some had no impact at all.

NOTES

- 1 Data on states with voluntary/advisory schemes are not available.

Prospective reimbursement, implicit in the Economic Stabilisation Program, is shown to have modified hospital behaviour. But the program differed in its intention from the typical scheme of prospective reimbursement by operating chiefly through the control of factor price increases. Individual schemes have very limited scope for such action and even the most actively administered schemes tend to assume that factor price inflation is outside their control. Nevertheless, evaluations on a nationwide basis in Chapter 5 show that individual schemes have modified hospital behaviour.

With the exceptions of Sloan and Steinwald (1980) and Coelen and Sullivan (1981), the review in Chapter 5 is of experience at the state level and not of individual hospitals. This level of aggregation is a useful approximation when states have only a single scheme, and its features can be assumed to apply to all eligible hospitals. One need know only the proportion of eligible hospitals. But in some states, for example in New York, more than one scheme exists and, for them, analyses must be limited to their common features. But even when states have single schemes, the studies reviewed in Chapter 5 give only the barest details of some of their features to allow the contribution of particular features to be identified.

In this chapter, therefore, we review the experiences of five particular schemes in greater detail. We review single schemes introduced in Connecticut, Rhode Island, and New York State, and two schemes introduced in West Pennsylvania. The schemes reviewed began some time ago, before the Economic Stabilisation Program was enforced. For all but one, Connecticut, it is possible to evaluate whether hospitals responded in the predicted way to the financial targets set for them. A number of conclusions from these five schemes are compared with the parallel conclusions reached in Chapter 5 based on nationwide experience of schemes. Mostly the conclusions agree. In making the comparisons and reaching some

additional conclusions our aim has been to put some flesh on the bare bones of the studies reviewed in Chapter 5.

Connecticut¹

The scheme in Connecticut was the first one sponsored by the Social Security Administration under the 1967 legislation which provided for federal support for hospital incentive reimbursement schemes. The scheme was introduced in 1969 to last three years until 1972. The last ten months of the third year of the scheme thus coincided with the Economic Stabilization Program. The scheme was available to hospitals on a voluntary basis, as required by the federal legislation (Elnicki, 1975, 47). The scheme involved a change from retrospective to prospective budgeting, with budget approval determined by peer review. Awards were available to hospitals that spent less than their approved budget and penalties were imposed on those that exceeded it. The object of the scheme was to reduce the increase in unit costs.

Details of the scheme and its evaluation refer to the short term general hospitals that participated. For the purposes of budget review participating hospitals were put into one of three groups, depending on their size: small (150 beds or less); medium (between 150 and 350 beds); and large (350 beds or more). Hospitals of the same size were thought to have a similar approach to management. Each group had six hospitals in the first year of the scheme. The review process involved two tiers of authority. The first tier was peer review through the exclusive representation of participating hospitals in the various budget approval boards. Each of the three groups was split up into two divisions, and membership of the budget review boards was drawn from one division to review hospitals in the other division of the same group. Thus no representative reviewed his/her own hospital. This separation could not have entirely prevented logrolling, although the second tier might have been used to avoid it. The second tier consisted of a single co-ordinating council for all hospitals in the scheme. It had a membership of 13, of whom only two represented the hospitals in the scheme. Judgements regarding the approved budget, awards, and penalties, however, were made exclusively by the budget approval boards (May, 1971, 50).

The review process was done on a line (department) basis. In the first year, housekeeping, laundry and linen, medical records, and nursing

service (medical and surgical) representing 28 per cent of total operating costs (May, 1971, 50) were reviewed. In the second year, administration and general dietary, plant operation, repairs and maintenance, and pharmacy were added, representing 59 per cent of the hospitals' costs in total (Elnicki, 1975, 48-9). In the third year, the operating room, recovery room, radiology, laboratory, and anaesthesiology were added for some of the hospitals and, in total, about 85 per cent of operating costs was subject to peer review (May, 1971, 50). The review process drew mainly on the individual hospital's historical experience. Little or no attempt was made to control the increase in wages; the focus of attention was on paid hours. Total departmental expenditure on non-labour items was also reviewed. Very little attempt was made to compare the hospitals' performances.

Retrospective adjustment to the initially approved budget at the settlement was built into the review system. Adjustments for differences between the projected and actual levels of activity were automatically approved. Adjustments were also allowed for 'occurrences (such as union contract demands in excess of what could have been anticipated and untimely breakdown of equipment) that the budget approval board is convinced were out of the control of the board' (May, 1971, 51). This statement needs interpretation. According to May there was a danger that the peer group review was so 'reasonable' that the review process effectively threatened to transform the notional 'prospective' characteristic back into retrospective budgeting:

One must get used to the idea that in a budget approval process, by its very nature, all facts cannot be known. Wages are estimated, especially where union contracts exist, volumes of services are estimated, new programmes are estimated both as to actual implementation and starting data, departmental turnover is estimated, ability to make staff reductions in cost centers which appear to have excess personnel is estimated, and so forth. With so many unknowns, it is only reasonable to expect that hospital administrators and financial officers (members of the budget approval board), who after all experience the same problems of estimation themselves, will either decide to approve the budget as submitted or agree to adjust difficult-to-measure budgeted costs to actual expenses at year end, thereby creating a retrospective system. (May, 1972, 84).

Hospitals that spent less than their final approved budget were allowed to keep the whole of their Blue Cross and Medicare portions of their income, being 32 per cent and 35 per cent respectively (Berkowitz, 1976). Thus the award was 67 per cent of the surplus. Hospitals whose per diem

costs were 10 per cent or more below the group average received an additional award, increasing from 1 per cent of actual costs if their costs were 10 per cent below the group average to 2 per cent if their costs were 20 per cent below the group average. Hospitals that exceeded their budget were paid the larger of actual expenditure plus 3 per cent, or the approved budget plus 5 per cent. This formula applied only to the Blue Cross portion of the hospital's income. The Medicare portion was exempt. In consequence the financial incentives for hospitals that exceeded their approved budget depended upon whether the excess was greater or less than 1.9 per cent ($=1-(105/103)$) of the approved budget. If it was less hospitals were paid a lump sum, being 5 per cent of the approved budget, minus 32 per cent of any deficit. Hospitals that had a larger deficit received 1 per cent ($=32 \text{ per cent} \times 3 \text{ per cent}$) of actual expenditure.

The scheme thus offered some incentive to hospitals to contain costs within any given year; but for hospitals to have done so would have been in conflict with their longer term financial objectives. Even though there was detailed budget review, hospitals that underspent in one year tended to have their approved budget reduced by a corresponding amount the following year. There is no evidence of a corresponding upward adjustment in the following year for hospitals that exceeded their budgets. Hospitals which thought they would not keep within the approved budget could opt out of the scheme, and eight of the original eighteen did so for this or some other reason. These eight were drawn from all six hospitals in the largest size group and one each from the other two groups.

The purpose of the scheme was to control the growth in expenditure, and Elnicki evaluates it in these terms by analysing its impact on the level of paid hours and expenditure on supplies. However, the scheme's financial targets were expressed in terms of per diem cost. We argued in Chapter 4 that, if it can be shown that schemes reduced total expenditure, then per diem costs probably fell too. We also pointed out that, even if total expenditure did not fall, per diem costs could, nevertheless, have fallen. The conclusions reached by Elnicki are interpreted accordingly.

Elnicki uses a simple but effective model to test the impact of the scheme. Eight hospital departments are covered, being administration, dietary, housekeeping, laundry and linen, plant operations, medical records, pharmacy, and non-maternity routine nursing. The sample studied is 35 general hospitals in Connecticut, all of which could have participated in the scheme. Data were collected for the twelve years from 1960 to 1971.

The period thus included the first two years of the scheme, and excludes the third year which coincided for the most part with the Economic Stabilisation Program. Hospitals participating in the scheme (the study group) are differentiated from the others (the control group) for all twelve years. This separation of study and control groups should ideally capture intrinsic differences between them not related to the impact of the scheme (Chapter 3). In addition, one or two minor adjustments are made to the model to reflect the responsibilities that individual departments might have had outside the hospital. None of the five avenues for the scheme to influence expenditure, including bed use, are included in the model. The model, therefore, allows the full impact that the scheme may have had upon paid hours and supplies to be identified. Binary variables are used to identify the two years the study group participated in the scheme and to differentiate the study from the control group for the whole twelve year period.

Elnicki finds no evidence that the scheme reduced the employment of staff or expenditure on supplies. They were, if anything, increased at hospitals in the scheme. Evidently the scheme failed in its main objective. The result, however, permits no conclusions as to the impact of the per diem cost target on per diem costs.

Even if we must remain agnostic about the incentives of the per diem cost target, there is no doubt that those responsible for administering the scheme, and others who had been fairly close to them, felt it had failed. A mixture of reasons are given, and they are as relevant in explaining why per diem costs might not have been reduced as they are for total expenditure actually remaining unchanged. One reason for failure focuses on the budget review process. Elnicki reports that the advice of management consultants was treated casually by the budget approval boards. And May, Director of Finance of the Connecticut Hospital Association, suggests that the budget review process had little extra to offer. As he points out:

Hospitals have had a uniform accounting system, an established cost funding programme, and a system of cost reimbursement for more than 20 years. Hospitals have shared detailed cost information among themselves through CHA (Connecticut Hospital Association) for many years, and this same information traditionally has been shared with state agencies and interested third parties. (May, 1972, 83).

Berkowitz, another senior official of the Connecticut Hospital Associa-

tion, suggests that the scheme's failure lay less with budget review 'per se', than with its associated problems. He states:

There were many things which made peer review function imperfectly: the actual data available at budget review time, the timeliness of the reviews themselves, the BAB's (budget approval board's) reluctance initially in making tough, unpleasant budget decisions, the short time span of the project, especially in the area of the professional service departments, the timeliness of completing the audit so that actual rewards would be dispensed and penalties assessed and lastly, the inexperience of BAB members with the entire peer review process. All of these situations did not in any way detract from the concept of peer review, and all these imperfections, given enough time, effort and willingness on the part of the participants, were subject to correction. (Berkowitz, 1973, 3).

Berkowitz, therefore, is optimistic about the scope of prospective reimbursement to contain costs, 'given time'. May, however, feels otherwise. May was initially optimistic (May, 1971, 51). Subsequently, however, he felt that the aims and vehicle of prospective reimbursement conflicted with the goals of those working in the hospitals. May had this to say:

I think it is now fair to say that, with a few exceptions, not-for-profit hospitals are not motivated by rewards, at least in the way we are applying them. The smaller hospitals appear to have been influenced by the idea of a reward, possibly because of the administrators' closeness to the details of their hospitals' operations. The reward-seeking seems to vary inversely with the hospital's size.

It is my belief that not-for-profit hospitals will provide the maximum amount of services possible given the available resources. If a reduction in costs can be accomplished in one area the available working capital will be used to increase and improve services in another. (May, 1972, 84).

May makes two points in this quotation. The first is that an inhibiting factor in an incentive program is the sharing of the awards and the penalties between too many people, except possibly at small hospitals. This is a presentation of the familiar 'free-rider' problem in economics. The second point draws attention to the conflict between the short-run (within the year) award and the longer-term cut in subsequent approved budgets.

New York State²

The scheme reviewed is the result of the State Cost Control Law of 1969 which 'provided for prospective rate setting by formula for all Medicaid

patients and Blue Cross patients' (Berry, 1976, 293). There has been one formula for all Medicaid patients, a second one for the Blue Cross plan for downstate New York, and a third one for the seven Blue Cross plans for upstate New York. No limit was set to the duration of the law. It came into effect in January 1970, and outlasted the Economic Stabilisation Program in operation from 1971 to 1974. There were several amendments to the law in 1976 which were intended to reduce third-party costs. Even though hospital participation has been mandatory, the principle of 'prospective rate setting has rarely been challenged' (Bauer and Clark, 1974a). Controversy has tended to centre on the design and implementation of the scheme.

The three formulae have adopted a common approach to the determination of the approved per diem to which no retrospective adjustment might be made. Hospitals could appeal the initially approved per diem. The initially approved per diem has been historically determined, based on actual expenditure two years previously, subject to a group ceiling for part or the whole of recurrent expenditure. The group ceiling was 10 per cent above the group mean per diem for 'routine' costs in the Medicaid and upstate New York plans. The ceiling for the City of New York was applied to per diem cost inflation, being 15 per cent above the appropriate group's mean value. The three formulae had their own sets of hospital groups, although all three took account of hospital size, type of facility, and location. In the case of Medicaid, account was also taken of ownership. A hospital price index was applied to total recurrent expenditure, but not to capital expenditure or bad debts. Capital expenditure and bad debts were reimbursed at historic cost after a two-year delay. Finally, the approved per diem assumed that specified occupancy rates would be achieved: 60 per cent for maternity, 70 per cent for paediatrics, and 80 per cent for medicine and surgery. Hospitals with lower occupancy rates were penalised insofar as the approved per diem assumed that these rates had in fact been achieved.

As one might expect from the formulae's designs, appeals were often made regarding the assignment to a particular group and the adjustment for inflation. Hospitals whose bed occupancy had been high before the start of the scheme also complained because bed occupancy was more likely to fall for them than for others, with adverse effects on their approved per diems. Hospitals generally, but particularly teaching hospitals, were critical of the lack of automatic provision for new programs. Those

starting new programs had to wait two years before their approved per diem was adjusted and, being paid at historic cost, had no compensation for inflation occurring during the intervening period.

Once the approved per diem has been established, hospitals have been allowed to retain any underspending. They have also been expected to cover the whole of any overspending. Medicaid and Blue Cross accounted for some 50 to 60 per cent of their income, and this has been the magnitude of their short-term financial incentive. Because the approved budget has been based on actual expenditure, subject to a group ceiling, any tendency for expenditure to exceed/fall short of the approved budget favourably/unfavourably affected the approved budget in future years. There has thus been a clear conflict between the short and long-term financial incentives, just as there was for hospitals which under-spent in the Connecticut scheme.

Five studies have evaluated the Cost Control Law for its impact to contain costs. Detailed reference by us, however, is made only to three of them: Berry (1976), Sloan and Steinwald (1980), and Dowling et al. (1976) as reported in Hellinger (1978, 388-393). Ruchlin and Rosen (1980, 43) report only briefly on the two other unpublished studies (Cromwell et al., 1976; and Elliot, 1976). The last two cover upstate New York during the pre-1975 period, and both are reported to find no evidence that costs fell. We reach the opposite conclusion from the review of the other three studies which cover downstate New York and New York State as a whole. The different conclusions make it, therefore, particularly unfortunate that the upstate New York studies have not been published to allow them to be included in this review.³

Berry covers the period from 1960 to 1974, Dowling et al. from 1968 to 1973, and Sloan and Steinwald from 1970 to 1975. Each study thus covers a period when the Economic Stabilisation Program was in operation and may have dominated such potential impact the Cost Control Law may have had in its first few years.

Berry evaluated the New York scheme by comparing the experience of hospitals there with those in New England and Ohio. The choice of these two states was because of their 'general geographic, socio-demographic and economic similarity' with New York State. A straight comparison is made between the three jurisdictions for their revenue, costs and resources, both per diem and per case. The evaluation is made at the (state) aggregate level, and not in terms of individual hospitals as Elnicki has done for

Connecticut. Average annual percentage changes are compared for three periods: before the law was introduced (1965-70), during its coincidence with the Economic Stabilisation Program (1970-73), and after the latter's termination (1974).

Given per diem cost targets in New York State, one would expect per diem cost inflation to be reduced more there during the law's enforcement than in the other two jurisdictions. This proved to be the case. There is evidence that patient stay increased in New York State, compared to the other two states, as might be predicted from hospitals wishing to keep within per diem cost targets. Per case cost inflation also fell relatively in New York State, without any relative change in admissions.

Berry is aware that factors apart from the law could account for the differential behaviour of unit costs over the period covered. He therefore concludes only tentatively 'that prospective rate reimbursement has had an impact in New York'. With the benefit of other more recent studies we believe that his conclusion can be held fairly firmly.

We have relied on Hellinger (1978) as the source for Dowling et al.'s unpublished evaluation.⁴ They evaluate downstate New York hospitals whose Blue Cross incentive reimbursement plan differed only in detail from the one for upstate New York. The study group is compared with all hospitals in Cleveland, Philadelphia, and Chicago in respect of the level of unit costs (per diem and per case), and their change over time. The period covered for the level of unit costs is from 1968 to 1973, and so includes data on all hospitals for two years prior to the imposition of the law. As in Elnicki's evaluation of the Connecticut scheme, the study and control groups are differentiated for the whole of the six-year period. Dowling et al. also correct for individual hospital differences in size, teaching status, capital intensity (not defined) and bed occupancy. This model thus includes two of the five identified avenues for the law to contain costs. Finally, the study group is differentiated by the use of a dummy variable for the period of the imposition of the law. This dummy variable measures the law's impact on unit costs. The law was in operation for four of the six years covered. However, for the last three-and-one-half years the Economic Stabilisation Program was also in operation.

A comparison of the study and the control groups indicates that downstate New York had higher unit costs, and that the law significantly reduced this difference. Even given the model's specification, which includes two of the avenues for its impact, the law is found to have re-

duced per diem costs by 5 per cent. Case costs are estimated to have fallen further by 8 per cent. One might have expected case costs to have fallen by less than per diem costs, because the reduction in per diem costs is reported by Berry to have been accompanied, as expected, by a lengthening of patient stay. However, a measure of bed use, bed occupancy, is included in the models of per diem and per case costs. Any tendency for the law to change bed use is thus substantially corrected for. The result indicates that, after correcting for the law's impact on bed occupancy, cost per case fell more than did cost per diem. The law thus modified bed use, and unit costs were also modified through avenues other than bed use.

Dowling et al. also find, as expected, that hospitals in downstate New York had a lower rate of per diem cost inflation compared with hospitals in Cleveland, Philadelphia, and Chicago between 1968 and 1973. Per case cost inflation was also lower in downstate New York. Hellinger does not report in full the models they use. However, he notes that a correction is made for hospital factor prices. He reports that per diem cost inflation over this period was 21 per cent for downstate New York, and 39 per cent for the control group. The corresponding data for case cost inflation are 17 per cent and 20 per cent.

Sloan and Steinwald (1980) offer some insights into the impact of the law on unit costs. Reference has already been made to their study in the evaluation of the Economic Stabilisation Program (Chapter 4) and of prospective incentive schemes on a nationwide basis (Chapter 5). Their study is also a potential source to evaluate the law because the hospitals subject to the law in their sample are practically synonymous with so-called 'formula' prospective reimbursement. The model includes a variety of factors identifying market supply and demand and individual hospital characteristics, including hourly wages for some hospital employees, one of the five avenues for the law to have had its impact on unit costs. The authors find that the sub-sample of hospitals (mostly comprising those from New York State) had similar, not lower per diem costs than elsewhere. Sloan and Steinwald (1980, 99) are puzzled by this result. They recognise they face estimation problems and seem ready to accept Berry's more favourable result of the New York scheme. We do the same, and no further reference is made to Sloan and Steinwald's study in this chapter.

Rhode Island⁵

Blue Cross has had to have official approval in Rhode Island before its premia may be raised. By the late 1960s this approval was given only on condition that Blue Cross found a way to contain the growth in hospital costs. A scheme introduced on October 1, 1970 was a solution offered. It lasted two financial years, developing by a process of evolution. The scheme was then abandoned 'because of complications arising from the simultaneous operation of the Economic Stabilisation Program' (Hellinger, 1976, 312), even though it had been given a 'procedural exemption' from the Economic Stabilisation Program in its second year (Zimmerman et al., 1977, 9). A new modified scheme was introduced in 1974 to take effect for three years. The new scheme was to include Medicare and Medicaid with the Blue Cross portion of the hospital's revenues. The discussion that follows refers to the original scheme.

There is contradictory documentary evidence as to whether hospital participation in the original scheme was voluntary or not. The confusion probably lies in the interpretation of this term, as explained in chapter 3. Zimmerman et al. (1977, 13) describe the 'program' as 'totally voluntary'. Hellinger (1978, 393) states that 'participation... was essentially mandatory'. Our understanding is that hospitals were required to participate in a scheme that had not been state legislated but rather had been set up voluntarily by Blue Cross. In the first year, detailed budget review was applied to only one of the fifteen hospitals, and the remainder, using their own discretion, fell into line with the ceiling for the percentage increases stipulated by Blue Cross. In the second year detailed budget review was extended to all hospitals.

The review process in the second year of the Rhode Island scheme involved many more parties than the Connecticut scheme reviewed above. The hospital's budget submission was reviewed both by those working in other hospitals and by Blue Cross. Blue Cross, in negotiating rates with the hospitals, had to bear in mind the need to obtain the state's approval for any increases in its premia. In the second year Blue Cross cut the hospital's projected increase in expenditure from 17.3 per cent to 12.2 per cent. Actual expenditure increased by 10.3 per cent (Bauer and Clark, 1974b, 25). Blue Cross was assisted in its negotiations by the involvement of a third party, the Health Planning Council, which helped settle the priority of requests for new programs. This has been a contentious sub-

ject in the New York State scheme with its formula approach. The approved budget was eligible for retrospective adjustment if the predicted and actual levels of activity differed substantially. Changes in activity were measured in terms of patient-days, services, home visits, deliveries and out-patient visits. Since the major part of hospital expenditure is for in-patient care, this effectively meant hospitals had a per diem cost target rather than a target on total expenditure. It is not clear whether the per diem cost target was set at the same level whatever the level of activity and, if not, by how much its magnitude changed.

The prospective budget applied to the Blue Cross portion of the hospital's budget, some 40 per cent of hospital revenue. Hospitals were allowed to retain half of the Blue Cross portion of the underspending, implying a marginal award of 20 per cent. Hospitals had to bear the full cost of overspending, representing a marginal penalty of 40 per cent. It was probably not clear to those running the hospitals how far actual expenditure would influence the approved budget in future years, because of the short duration of the scheme and the flexible approach to its implementation by those who designed it. Actual expenditure probably had little influence on the following year's approved budget, because the budget was reviewed each year.

Evaluations of the original scheme may be found in Hellinger (1976 and 1977) and Zimmerman et al. (1977). The authors review the same evidence and use the same model, but they reach different conclusions about the impact of the scheme on the level of unit (per diem and per case) costs. We believe that the scheme did contain patient costs.

A comprehensive model of unit costs is used to estimate the impact of the scheme. Unit costs, expressed in constant prices, are analysed in terms of case mix, size, teaching status, bed occupancy and, in the case of cost per case, length of stay. The correction of unit costs for the inflationary trends is based on the experience of hospitals in New England. Thus, whatever may have influenced the magnitude of the price deflator the Rhode Island scheme was not it. On the other hand, bed use, one of the five avenues which would allow the scheme to influence unit costs in Rhode Island, is included in the model's specification, and so reduces the measured impact the scheme may have had.

The model is tested in two ways. One is to compare the experience of the thirteen community general hospitals in Rhode Island with twelve hospitals in Massachusetts, selected for their similarity 'in several respects

(e.g., size, ownership, scope of service)', but only for the two years of the scheme's operation. This study thus suffers from the failure to fully measure intrinsic cost differences between the study and control groups (see chapter 3). One cannot, therefore, place much reliance on the estimated impact of the scheme as reflecting its actual effect quite apart from the inclusion of bed use in the model of unit costs.

A more fruitful test of the scheme is the pooling of annual data on the thirteen community general hospitals for the four years, 1969 to 1972. Thus there are data for two years prior to the scheme, and for the two years of its operation. Unfortunately, the scheme hardly anticipated the Economic Stabilisation Program. The scheme began on October 1, 1970, whereas the program began on August 17, 1971, before the end of the scheme's first financial year. The scheme was given a procedural exemption during its second year, but hospital wages and salaries and the prices of supplies were still controlled. Nevertheless, since the model of unit costs is corrected for the inflationary trends in New England, the impact of the program on unit costs through this avenue should be corrected for.

National experience of cost inflation contrasts with that for the Rhode Island scheme evaluated in New England hospital constant prices. National experience of per diem cost inflation for the duration of the Rhode Island scheme is for it to rise by 1.7 per cent points between 1969 and 1970, by 1.8 per cent between 1970 and 1971, and by 0.5 per cent between 1971 and 1972. Case cost inflation fell over this period, but only by 0.1 per cent, 1.3 per cent, and 0.9 per cent points (Sloan, 1981). This national experience of changes in patient cost inflation should be compared with the decline in per diem costs (measured in constant prices) estimated to be 3 per cent (statistically significant for the one-tail test). The reduction associated with the scheme may be small, but it must be set against a background of national increases in per diem cost inflation of some magnitude. The 3 per cent estimate also excludes any impact that may have arisen from hospitals responding by altering bed use. Case costs are estimated to have fallen by 5 per cent. National trends indicate hardly any reduction in case cost inflation at this time. We conclude, therefore, that hospitals in Rhode Island did respond to the per diem cost target in the manner predicted.

Two schemes are reviewed. First the original scheme introduced by Blue Cross in 1950. Second the new scheme, an alternative to the existing one, introduced in the financial year 1972. The two are taken in turn.

The original scheme

Prospective budgeting was first introduced by Blue Cross in 1950. There is every suggestion that whilst the scheme was set up at Blue Cross's own initiative, hospital participation in it has been mandatory (Hellinger, 1976, 210). From time to time the original scheme was modified. At first hospitals were put into one of three groups based on location. In 1966 the groups were further divided by a threefold classification based on the extent of the hospital's teaching program. Throughout this period each hospital had a ceiling for reimbursement, being 10 per cent above its group average per diem that year.

In West Pennsylvania hospitals have been allowed full reimbursement up to the ceiling, but only up to this amount. They have had to fund the Blue Cross portion for any excess. The Blue Cross portion has contributed some 35 per cent of hospital revenue (Hardwick and Wolfe, 1972, 114). The short-term marginal awards and penalties have thus been 0 per cent and 35 per cent respectively. There have been more than 100 hospitals in the scheme, so the action of any one, even when there were nine groups, would be unlikely to have had an appreciable influence on its own approved per diem in subsequent years. Only if the hospitals in the individual groups acted collectively, as in a cartel, would there be some correspondence between individual hospital action, one year with another.

In an interesting paper, Lave et al. (1973) analyse the experience of the scheme over the three-year period from 1966 to 1968: that is, the first three years of the modification noted above. The authors have a model of per diem cost inflation over the three-year period. Included as explanatory variables are initial (1966) per diem cost and the group to which the hospital was attached. None of the five identified avenues by which the scheme might have influenced per diem costs (the target) are included in the model. Thus the model gives full scope for the hospital's response to be identified. Only hospitals in West Pennsylvania are studied, and the experiences of each are compared. No estimates are

published, but the authors report a significant negative correlation between changes in per diem costs and initial per diem costs. This negative correlation is consistent with the financial incentives associated with the group ceiling being sufficiently strong for the ceiling to restrain per diem cost inflation.

The authors obtain a similar result in a previously published paper in which estimates are given (Lave and Lave, 1970). This earlier study is also of hospital cost inflation, focusing again on per diem costs. The model tested has a similar specification and differs substantially only in its inclusion of bed occupancy. A different period is covered, from 1961 to 1967, when the mean value of per diem cost inflation for the sample of 74 hospitals in West Pennsylvania was 6.6 per cent per annum. The authors find that base year (1961) per diem cost is significantly negatively correlated with subsequent per diem cost inflation, even without an accommodating adjustment in bed occupancy. They estimate that hospitals whose per diem costs in 1961 were 10 per cent above the mean value of logarithmic transformation of per diem costs had per diem cost inflation 1 per cent lower per annum up to 1967. Had the model been so specified as to allow bed occupancy to vary, then the estimated impact would probably have been larger.

Although the scheme demonstrably influenced the performance of individual hospitals, Lave et al. (1973, 84-85) state that there is no 'a priori' reason why it should result in hospitals in West Pennsylvania having a lower rate of cost inflation than elsewhere. As they point out, the group ceilings discourage those whose initial costs were high, but offer a built-in incentive for costs to escalate at hospitals whose initial costs were low. It should also be pointed out that if the hospitals in a group act as a cartel then there is further reason for the ceiling to be impotent in containing costs. Lave et al. do not refer to cartel-like behaviour, possibly because it is not necessary to do so to explain the events that took place. The authors test their prediction by comparing per diem cost inflation and changes in room charges in West Pennsylvania with Pennsylvania as a whole, and with America between 1966 and 1969. The authors find, as predicted, that neither dimension was similar in West Pennsylvania and elsewhere.

The new scheme

A new scheme was introduced in the financial year 1972 as an alternative to the original one. It was voluntary and introduced two changes. First, hospitals had their own approved budgets that were independent of the group ceilings. The approved budget, with its implied cost per diem, was determined by budget review, with the object of modifying cost inflation. The review focused on the growth, not the level of department expenditure.

The second change was to increase the financial incentives. Awards were introduced for hospitals that spent less than their approved budget. They were now allowed to keep one-half of the Blue Cross portion of hospital income which was 35 per cent. The marginal incentive was thus approximately 20 per cent ($35 \text{ per cent} \times 1/2$). Hospitals in the new scheme also had penalties if they exceeded their approved budget, even though they may not have exceeded the group ceiling. Hospitals had to bear one-half of the difference for the Blue Cross portion, creating a marginal penalty of 20 per cent on expenditure in excess of the approved per diem. The marginal penalty increased to 35 per cent (for all hospitals whether in or out with the new scheme) if expenditure exceeded the group ceiling. There is no evidence that the new scheme, any more than the original one, was so designed that actual expenditure in one year influenced its approved budget the following year.

Five hospitals took advantage of the new scheme in its first year. Hellinger (1976, 311) described them as 'small, rural hospitals... among the high cost hospitals in their group'. More than one hundred were eligible, and by the financial year 1976, five years later, only eighteen had joined. All five hospitals that joined at its beginning had an award in at least one of the first three years; but only two had one for two years; none had one for all three. Only two of the five were in overall surplus for their Blue Cross portion, taking undiscounted the first three years experience of the new scheme.⁷

Two evaluations of the new scheme are available: one by Applied Management Sciences, Inc., unpublished, but reported in Hellinger (1976); the other by myself. The two are taken in turn.

Applied Management Sciences, Inc., compare the five participating hospitals (the study group) with a control group of ten hospitals remaining in the original West Pennsylvania scheme. The control group is comparable

in respect of 'size, occupancy rate, scope of services, teaching activities and percentage of the county population living in a rural area'. Since non-participating hospitals were also subject to prospective budgeting, the differences between the two groups were budget review and the magnitude of the financial incentives, which were greater at the margin for the new scheme.

As in Berry's study of the New York scheme, the evaluation is based on a comparison of the aggregate experience of the two groups. Hellinger reports that annual per diem cost inflation between the financial years 1970 and 1974 was lower for the five hospitals which joined the new scheme. Hellinger, like Berry, is aware of the simplicity (and deficiency?) of such straight comparisons, but the impression is given that he attributes a major portion of the measured difference to the new scheme.

Access to some unpublished data encouraged us to re-evaluate the new scheme and two modifications to it which took effect in the financial year 1974. The two modifications are the addition of Medicare to the new Blue Cross scheme, and the increase in the new scheme's group ceiling from 10 per cent to 12 per cent.⁸ The influence of all three is tested in the same way as the three models referred to already, by reference to per diem cost inflation. Hospitals have per diem cost targets, and we would expect the new scheme to reduce per diem cost inflation. The addition of the Medicare portion of hospital income should also reduce per diem cost inflation through raising the marginal incentives. Raising the group ceiling is likely to increase per diem cost inflation at least temporally. The last two changes took place at the same time, and one can estimate only their net impact. The impacts of the new scheme and of the two changes to it which took effect in the financial year 1974 are identified by the use of a pair of dummy variables.

The only other factor included in the model of per diem cost inflation is the influence of the group ceiling noted by Lave et al. (1973). Instead of using base year (1971) per diem costs to predict inflation in each succeeding year, the form used is as shown in Equation 6.1. That is, the base year is redefined for each year's annual percentage change in per diem costs. None of the five avenues, such as bed use, by which hospitals can achieve their per diem targets are included in the model.

$$\frac{AC_{i,t} - AC_{i,t-1}}{AC_{i,t-1}} = a + bAC_{i,t-1} \quad (6.1)$$

where

$AC_{i,t}$ is the per diem cost at hospital i in year t .

The model is tested by analysing annual percentage changes of average and Blue Cross per diem costs over the four financial years from 1971 to 1974 (BCWP, 1975b, 31-32). This period more or less coincided with the Economic Stabilisation Program. The new scheme started July 1, 1971, and ended, for the purposes of this evaluation, on June 30, 1974. The program lasted, as noted above, from August 15, 1971 to March 30, 1974. If the new scheme had an impact during the period studied then it must have been additional to that arising from the Economic Stabilisation Program.

To estimate the additional impact of the new scheme, data are collected on two groups of hospitals: the five that joined the new scheme at its beginning (the study group), and six others selected by Blue Cross for their similar characteristics (the control group). Data are not available to estimate inflationary trends for the two groups prior to the beginning of the new scheme; and any conclusions based on the estimates derived must therefore assume that the inflationary trends of the two groups, apart from the influence of the new scheme, were much the same. This assumption seems more reasonable than a similar one of levels of unit costs, particularly as the sample of hospitals studied are within the same jurisdiction. One hospital in the study group is different from the rest. Its function is specialty long-term, whereas all the others are general community short-term acute. This exceptional hospital is identified by a dummy variable to test whether its inflationary experience was different from the rest.

The three sets of data on annual percentage changes are pooled, and the model is given a linear specification and estimated by ordinary least squares. The results of the analysis and the expected signs of the various coefficients are given in Table 6.1.

The results do not support the hypothesis that the new scheme reduced per diem cost inflation, even though the model is so specified as to allow the new scheme to influence costs by all five avenues. The absence of the predicted negative correlation is surprising even if the new scheme had failed to reduce per diem costs. The new scheme was voluntary, and comparisons are made between hospitals, all of which were eligible to participate. One might have expected, therefore, an element of self-

TABLE 6.1

Analysis of annual percentage change in per diem cost, West Pennsylvania, financial years 1971-4

	Expected sign	Average per diem	Blue Cross per diem
Specialist long stay	N.K.	3.34 (3.47)	4.58 (3.82)
Initial per diem	(-)	-0.27 (0.14)	-0.36 (0.15)*
New scheme	(-)	0.98 (2.33)	-0.99 (2.74)
1974 amendments	N.K.	-5.75 (3.34)	-4.52 (4.28)
Inflationary trend			
1971-2 (in constant term)	N.K.	1.23 (2.32)	1.62 (2.61)
1972-3			
1973-4	N.K.	4.43 (3.22)	8.33 (3.68)*
Constant term	(+)	25.90	31.50
R ²		0.23	0.32
F-value		1.31	2.00
Degrees of freedom		26	26

* denotes statistically significant from zero at the 5 per cent and 1 per cent significance levels respectively. Standard errors are in parenthesis.

Change in average annual average per diem (%)	10.8	5.2
Change in annual Blue Cross per diem (%)	10.7	6.3
Initial average per diem (\$)	62	9
Initial Blue Cross per diem (\$)	65	9

selection to operate, and that the hospitals most likely to meet the scheme's targets would have been the first to join. Possibly the five that joined the new scheme from its beginning were simply mistaken. As we noted above, only two had a net balance from their participation at the end of the first three years. Several of the hospitals that joined the voluntary Connecticut scheme seem to have been equally mistaken.

There is no evidence that per diem cost inflation for the long-stay hospital was different from the community general hospitals. This result is some support for our assumption that the study and control groups had similar inflationary trends. Finally, the results provide further support for the hypothesis that the group ceiling mattered, and that marginal penalties of 35 per cent were sufficient to modify hospital behaviour. Our

estimates indicate that hospitals whose per diem costs were 10 per cent above the mean value in one year experienced a rate of cost inflation over the next twelve months some 3 per cent points lower than other hospitals. At that time per diem cost inflation was about 10 per cent, so hospitals responded fairly radically to the ceilings they faced.

This study and the evaluation by Applied Management Sciences Inc. reach very different conclusions, even though they refer to a similar set of hospitals and cover more or less the same period. Two possible explanations come to mind. First, the two studies differ in their specification of the model of per diem cost inflation. Most significantly, we include base year per diem costs whereas Applied Management Sciences, Inc. do not. The significance of this difference is at once evident when we are reminded that the five hospitals in the study group were 'high cost hospitals in their groups'. The different specifications result in a different interpretation of the subsequent decline in per diem inflation of the study group. By including base year per diem costs in our model we allow the group ceiling to have its influence. Once adjusted for, there was no scope for the new scheme to have an influence of its own. Given such an interpretation, the new scheme could still reduce cost inflation at hospitals whose base year costs were low in relation to their group.

Second, the two studies differ in the way the study and control groups are compared. As reported by Hellinger, Applied Management Sciences, Inc. aggregate individual hospital experience to the level of study or control group, as appropriate. In consequence, only inter-group differences are identifiable. In our study individual hospital experiences are compared. Once done, it becomes evident that intra-group differences may well have dominated the inter-group differences that also existed.

In conclusion, the original scheme controlled per diem costs, even without bed use varying; whereas the new scheme did not control unit costs, even after allowance was made for the possible impact on per diem costs of bed use varying.

Summary and some further conclusions

A summary of the key features of the schemes reviewed in this chapter is given in Table 6.2, together with a summary of the evaluations and conclusions reached. Five different schemes are reviewed, two for West Pennsylvania, and one each for the remaining three jurisdictions. Three

TABLE 6.2
Summaries of schemes in four jurisdictions and their evaluations

	Conn.		N.Y.		Rhode Island	W. Pennsylvania		
						original		new
<u>Design of scheme</u>								
Scheme mandatory?	no	yes	yes	yes	no	no	no	no
Hospital participation mandatory?	no	yes	yes	yes	yes	yes	yes	no
Budgetary review?	yes	no	no	no	yes	no	no	yes
Short-run award (%)	67	50-60	50-60	50-60	20	0	0	20
Short-run penalty (%)	32	50-60	50-60	50-60	40	35	35	20/3
Long-run consequence adverse?	yes	yes	yes	yes	no	no	no	no
<u>Evaluation of scheme</u>								
Source of evaluations	1	2	3	3	4	5	6	7
Coincided with ESP?	yes	yes	yes	yes	yes	no	no	yes
Model includes:								
Bed use?	no	no	yes	NK	yes	no	yes	no
Hospital factor prices?	no	no	no	yes	no	no	no	no
Input intensity?	no	no	yes	NK	no	no	no	no
<u>Conclusion</u>								
Per diem cost inflation reduced?	NK	yes		yes		yes/no	yes	no
Per diem costs reduced?	NK		yes		yes			

SOURCES: (1) Elnicki (1975); (2) Berry (1976); (3) Dowling et al. in Hellinger (1978); (4) Zimmerman et al. (1977); (5) Lave et al. (1977); (6) Lave and Lave (1970); (7) this study.

evaluations are made for the New York State scheme, and two for the original West Pennsylvania scheme. Only one evaluation is reported for each of the three other schemes.

First we compare the conclusions reached in Chapter 5, based on the nationwide experience of prospective reimbursement schemes, with parallel conclusions reached in this chapter based on the experience of four jurisdictions.

Prospective incentive schemes typically have had per diem cost targets. One major conclusion reached in Chapter 5 is that such schemes tended to reduce per diem costs, even when they ran concurrently with the Economic Stabilisation Program. The schemes evaluated in Chapter 5 are typically state legislated. A similar conclusion is reached in this chapter for state legislated and voluntary schemes. All five schemes

reviewed in the chapter had per diem cost targets and, with the exception of the Connecticut scheme, are evaluated for their impact on per diem costs. Three of the remaining four schemes are found to have reduced per diem cost inflation and/or per diem costs. The one that did not is the new West Pennsylvania scheme.

In Chapter 5 the studies evaluating schemes on a nationwide basis tend to concentrate upon those that had been state legislated. Three include other schemes and distinguish them from state legislated schemes (Congressional Budget Office, 1979b; General Accounting Office, 1980; and Coelan and Sullivan, 1981). Only Coelan and Sullivan evaluate both types of schemes for their impact on per diem costs. The other two evaluate them for their impact on per capita expenditure and cost per case. Nevertheless, all three give consistent evidence that state legislated schemes are associated with a larger impact than voluntary schemes. A similar conclusion is also reached in this chapter.

Only one scheme, in New York State, is mandatory in the sense that it was state legislated. Two others, in Rhode Island and the original West Pennsylvania, are voluntary, but hospital participation in them was mandatory. The two remaining schemes, in Connecticut and the new West Pennsylvania, are voluntary, and hospital participation in them is voluntary too. The three classes in the mandatory/voluntary spectrum are thus identified, and their impact on per diem costs varied accordingly. The mandatory scheme in New York State reduced per diem costs and per diem cost inflation. Only one of the two schemes in the voluntary/mandatory class reduced per diem costs. The Rhode Island scheme reduced per diem costs; the original West Pennsylvania scheme did not, in the sense that per diem cost inflation for the group of these hospitals did not fall as compared with hospitals elsewhere. The voluntary new West Pennsylvania scheme did not reduce per diem cost inflation and, if the self-selection bias were corrected for, probably would have shown per diem cost inflation to have increased. A similar conclusion is suggested for Connecticut when comparing expenditure trends. Expenditure in Connecticut tended, if anything, to increase; whereas the nationwide study, for a later period, showed that prospective incentive schemes tended to cause expenditure to fall, especially in states with mandatory schemes (Congressional Budget Office, 1979b).

A further conclusion reported in Chapter 5 is that state legislated schemes had no impact on per diem costs in their first two years, but did

so thereafter (Sloan, 1981). The evaluations in this chapter suggest that this conclusion is unduly pessimistic. Three of the schemes - Connecticut, Rhode Island and the new West Pennsylvania one - are evaluated over a period that is limited to their first 2, 2, and 3 years respectively. Two, in Connecticut and West Pennsylvania, would seem to have failed to reduce per diem costs; but the Rhode Island scheme had some success. The failure of the first two schemes cannot, therefore, be explained in terms of their immaturity. Indeed, the West Pennsylvania scheme was an addition to one existing since 1950. Some other explanation is required.⁹

The most probable explanation in the position of the three schemes is the mandatory/voluntary spectrum. Participation in the Connecticut and Rhode Island schemes was completely voluntary and, because of this, those administering them must have been inhibited from setting tough budgets. This is well illustrated in the description of the budget review process for the Connecticut scheme given in this chapter. Even so, eight of the original eighteen participating hospitals still dropped out before the scheme has completed its planned duration of three years. The West Pennsylvania scheme had, however, a rather different experience. All five hospitals that joined it from its beginning were still participants three years later, even though three were out-of-pocket at that stage as a result. Despite the mixed experiences of continued participation in the Connecticut and West Pennsylvania schemes, it is not difficult to imagine the greater ability of those administering the Rhode Island scheme in setting tough budgets, where hospital participation was mandatory. The key to achieving that obligation may well have been the key to that scheme's success, and provides a clue to such success as some other schemes have achieved.

Next we draw attention to two conclusions based on evidence only available in this study of individual schemes. First, even if hospital participation were mandatory and tough budgets were set, it would still be necessary to encourage hospitals to keep within their budgets. The method chosen by the schemes reviewed has been to offer financial incentives, that is, being penalties and/or awards depending upon whether expenditure exceeded/fell short of the approved budget. Three of the five schemes did modify hospital behaviour, and their incentives indicate what magnitudes were sufficient for the schemes to have been effective. Data are given on the short-run (within the year) and long-run (subsequent year or years) financial incentives for these three schemes in Table 6.2.

The original West Pennsylvania scheme suggests that the short-run incentives can be quite small, so long as current expenditure does not influence the approved budget in the future. Hospitals had no awards for spending less than their group ceiling, and a marginal penalty of 35 per cent if they exceeded it. The New York State scheme did not satisfy the long-run condition. Actual expenditure has influenced the approved budget with a two-year delay. But the short-run marginal incentives, both awards and penalties, have been higher, by an order of magnitude, than those in the original West Pennsylvania scheme.

The actual magnitude of the incentives depends on the proportion of hospital income affected by the scheme and the proportion of the discrepancy between expenditure and the approved budget borne by the hospital. The small incentives necessary for the West Pennsylvania scheme suggest that neither proportion need be large. Thus if 50 to 70 per cent of hospital income were affected, hospitals need bear only half of expenditure in excess of their approved budgets for the targets to be effective. If all hospital income were covered by a scheme or a combination of similar schemes, then the hospital need bear only one-third of expenditure in excess of its approved budget. The examples could be further multiplied.

Second, it is evident that the approved budget may be set by more than one method and still allow costs to be contained. In the Rhode Island scheme, the approved budget was set by negotiation at the individual hospital level, and yet costs were contained. In the New York State scheme, arbitrary formulae were applied to groups of hospitals, and costs were also contained. Nevertheless, arbitrary formulae are not a guarantee of success as the experiences of the New York State and original West Pennsylvania schemes witness. The latter may have controlled costs at some individual hospitals, but it did not succeed, as the New York State scheme had, for the group of hospitals as a whole.

Lave et al. (1973) provide a ready explanation for the failure of the original West Pennsylvania scheme. Hospitals close to their group ceiling had sufficiently strong financial incentives to contain costs, but for others the ceilings were a positive licence to spend. Hence group costs creep up, largely through disproportionate increases by hospitals whose initial costs are low. If this was true of the original West Pennsylvania scheme, why was it not true of the New York State scheme as well? Frankly, we are not entirely convinced by the suggested explanation given below.

Both schemes used formulae based on group ceilings. But two identi-

fied differences in the formulae could explain why the New York State scheme had more success in containing per diem cost inflation. The first difference relates to the group ceilings. The West Pennsylvania scheme had a ceiling based on the group's current costs; whereas the New York State scheme had a ceiling based on expenditure two years previously. Those administering the New York State scheme adjusted for inflationary trends in recurrent expenditure but, in all likelihood, they had some discretion to make less than full adjustment. Second and possibly of greater importance is that capital expenditure and bad debts in the New York State scheme were reimbursed after a two-year delay and then only at historic cost. This unfavourable treatment, especially of capital expenditure, may well have restrained the growth of per diem costs.

So what can we conclude? Hospital participation must be mandatory, even if the scheme is not the result of state legislation. Tough budgets can then be set. The choice of the means to do so does not seem to matter much. If formulae are used, some care in their design is necessary for them to be both acceptable to the hospital, despite their arbitrariness, and for them to encourage hospitals to contain costs. The financial incentives in the short-term can be quite small for costs to be contained, so long as the subsequent approved budget is not adversely affected. Finally, such schemes can make themselves felt within two years.

NOTES

- 1
- 2 The description of the New York State scheme comes from Bauer and Clark (1974a), Berry (1976), and Ruchlin and Rosen (1980).
- 3 Some useful comments on the study by Cromwell et al. of the upstate New York scheme may be found in Salkever (1979, Table 4-1 and 142-3).
- 4 Salkever (1979, 144-5) makes a number of comments on Dowling's unpublished study. Several of these comments are based on material not reproduced in Hellinger (1978).
- 5 Four papers recently published are referred to: Bauer and Clark (1974b) Hellinger (1976 and 1977) and Zimmerman et al. (1977). The last provides most of the information for the description presented here.
- 6 The following studies have been used: Blue Cross of Western Pennsylvania (1975a and 1975b), Hellinger (1976), Lave and Lave (1970), and Lave et al. (1973). The last cited reference provides the most useful description of the early period. I should like to acknowledge the assistance of Mr. C.M. Sedlack, Blue Cross of West Pennsylvania, in the preparation of this portion of the study.
- 7 The data are taken from BCWP (1975b, Table VII).

- 8 The documentary evidence regarding the year when the ceiling was raised is conflicting. Hellinger (1976, 311) puts it at 1971, and a report by Blue Cross (BCWP, 1975b, fn on p.11) at 1974. The later date was confirmed by Mr. Sedlack, one of the Blue Cross officials, and was selected for this reason.
- 9 The evaluations of the Rhode Island and new West Pennsylvania schemes are biased in favour of the latter showing that costs would be contained to a greater extent. The fact that this bias is not evident is suggestive of the greater impact of the Rhode Island scheme. The bias comes from two sources. First, the choice of specification in the model used to evaluate the schemes can influence their estimated impact (chapter 3). This influence depends on the extent to which one or more of the five avenues which may influence the schemes' unit costs are included in the specification. None are included in the model to evaluate the new West Pennsylvania scheme, so its full impact can be estimated. The model used to evaluate the Rhode Island scheme, however, includes bed use, and to that extent its estimated impact is muted. Second, the choice of study group with which comparisons in the evaluation can be made also favours the new West Pennsylvania scheme. In this case comparisons are of two groups of hospitals both eligible for the same scheme, and so gives rise to possible bias from self-selection. By way of contrast, the Rhode Island scheme is evaluated by comparing the same thirteen hospitals before and during that scheme's operations.

PART III

EXPERIENCE IN ONTARIO

The British North America Act, Canada's constitution, gives major government responsibility for health services to the provinces. No national health service therefore exists. Instead the provinces have developed their institutions in their own particular ways. Hospital finance and prospective reimbursement have been influenced accordingly. For this reason our analysis focuses on one particular province, Ontario. The results should not be assumed to be representative of all other provinces, but they will give a flavour of the Canadian experience as a whole.

Until January 1, 1959, when Ontario participated in the federal-provincial Hospital Insurance and Diagnostic Services Act (HIDSA) of 1957, the financial situation of hospitals probably differed little from those in America prior to the introduction of Medicare in 1966. Mental hospitals and tuberculosis sanatoria were and have remained a distinctively provincial responsibility in respect of their provision and finance. Patients admitted to these hospitals have been expected to pay next to nothing for the care they receive. Public general hospitals, on the other hand, received only a small fraction of income from public sources. Only 14 per cent of the income for these hospitals came from these sources in 1954 (Taylor, 1957, 43). At that time municipalities were required by provincial law to pay \$6 per diem for indigent patients. The province paid an additional \$1.95 per diem for these patients and a further \$2.35 per diem for all patients in public wards as a 'maintenance grant'. Per diem costs at public general hospitals in Canada as a whole were about \$13. Municipalities also made payments to hospitals to help cover their deficits (Taylor,

1957, 15; and Taylor, 1978, 111-112).

Voluntary hospital insurance was well established in Ontario by the mid-1950s. Some 67 per cent of the provincial population and hospital coverage (Taylor, 1957, 49). Blue Cross covered 37 per cent of the population, commercial insurance covered 30 per cent, and other schemes covered some 5 per cent. However, those not insured made much less frequent use of hospitals. In 1953 their admission rate was 30 per cent lower although, once admitted, they stayed on average 60 per cent longer (Taylor, 1978, 117). As a result, voluntary insurance contributed nearly half (47 per cent) of the revenue of public general hospitals in 1954. Patient charges contributed 25 per cent and donations 3.5 per cent that year (Taylor, 1957, 43).

It is worth remembering that in 1954 Saskatchewan and British Columbia had their own compulsory and, effectively, universal public hospital insurance schemes. Alberta and Newfoundland had similar schemes that covered some 75 per cent and 50 per cent of their respective provincial populations. Manitoba and New Brunswick, on the other hand, had no public hospital insurance schemes, and patient charges were a far more important source of hospital revenue there than in Ontario, being 36 per cent and 42 per cent respectively (Taylor, 1957, 43).

The federal-provincial hospital cost-sharing program, HDSA, was the eventual outcome of an initiative of the Ontario premier at the federal-provincial conference in 1955. The federal government made a provisional offer later that year, and the Ontario legislature established the Ontario Hospital Services Commission in March 1956. The commission was to become the instrument used in Ontario to implement HDSA. The commission was assisted in its task by the transfer of most of the staff of Blue Cross by the end of 1958, in time for Ontario's participation on January 1, 1959, who then became public employees. In 1972 the commission lost its separate identity and became part of the Ontario Ministry of Health.

Participation in Ontario's plan has been mandatory for all groups with 15 or more employees. Participation for others has been voluntary. The premia were initially set at \$2.10 per month for single people and \$4.20 for families. The indigent were protected as previously. Protection was automatic for those in possession of a Medical Welfare Plan identification card (D.N.H.W., 1959, 47). For those without one the municipality would either pay the premia or the statutory per diem charge for those not insured. The commission picked up the difference in the latter case. At

the inception of the plan, 91 per cent of the provincial population were insured. The proportion increased to 94 per cent two years later. More recently, staff coverage has become effectively universal, even though premia continue to be used as a source of public finance (Soderstrom, 1978, 128).

The province's plan has become the dominant source of revenue for all hospitals, possibly even for private ones too. In the financial year 1978-79, it contributed 91.9 per cent of the income for the public, general, and allied special hospitals (S.C., 1981b, Table 24), i.e., all hospitals except for the few federal and private ones. Charges were nevertheless made. Workmen's Compensation contributed 1.3 per cent that year, the federal government through its Department of Veteran's Affairs contributed 0.7 per cent, residents from other provinces covered by their respective plans contributed 2.4 per cent, and so on. These and some other sources, such as part of the hospitals' income from private and semi-private accommodation, were set against the hospitals' costs to determine how much Ontario's plan should contribute to that extent, the source of income was irrelevant to the hospitals' financial situation. More significant to the hospital has been its non-deductible income, coming from donations, etc. But these have been small both individually and collectively and, to that extent too, they have not affected the hospitals' financial situation on any significant scale. Thus to all intents and purposes the overwhelming source of hospital income in 1978-79, as for the rest of the period after 1959, has been the province's plan.

This concludes the introduction to the way hospitals have been financed in Ontario. The period covered in this study is from 1969 to 1975. The beginning is significant because this was when 'global budgeting' was introduced 'in an attempt to control the rapidly escalating costs of health care' (Ontario, MOH, 1974a, 6). Later that year, on October 1, Ontario began its participation in the federal-provincial Medical Care Act of 1966. But this event is of no significance to our study. The act has undoubtedly had a variety of different effects on the hospitals, but none include the way they have been financed. HDSA covered the cost to hospitals of employing residents, interns, and qualified specialists such as radiologists and pathologists. It continued to do so. No significance should be attached to the year when this study terminates.

The taxonomy used¹

In chapter 3 we briefly outlined the taxonomy for the analysis of hospital prospective reimbursement. Seven features are identified. Information on six of them was used in Part II of our analysis of American experience of prospective reimbursement. These six were reduced to three: one indicating the degree to which participation is mandatory; one indicating how the budget is set; and one indicating the financial incentives. One need hardly say more about the point of the summary features than that hospital participation has been mandatory for that part of its income which came from the province's health insurance plan. The last two are described at length in this chapter.

First, we believe it is important to differentiate between how the approved budget is determined and what hospitals are actually paid. In the review of American experience very little information on the former is publicly available even for the individual schemes studied in Chapter 6. A large part of this chapter is given over to filling this particular gap. Doing so has some intrinsic value; but, in addition, it draws attention to the mechanisms available to hospitals, if any, for them to pursue such financial goals as they may have. This topic is covered in the next section.

Second, a particular feature of the period studied is its coincidence with the introduction of 'global budgeting' in Ontario. This term is used in its conventional sense to indicate the absence of financial restrictions on how the hospitals' approved budget is spent. We explore the freedom hospitals actually had. Global budgeting should be contrasted with 'program budgeting' and 'line budgeting' which apply financial restrictions to programs such as maternity care or to resources such as nurses. This

topic is studied in this chapter.

Third, we have already distinguished between the budget approved and what is actually paid. A further distinction should be recognised between what the hospital spends and what it is actually paid. In Ontario, as indicated in the introductory remarks to Part III, the major source of hospital income comes from the province's health insurance plan. In this chapter we identify the extent to which the Ministry of Health took financial responsibility for covering hospital expenditure, and draw particular attention to the attendant financial incentives hospitals faced at that time.

Determining the approved budget

This section focuses on how the approved budget was determined for public general hospitals in the period 1969 to 1975. The formulae approach was applied to most of the hospitals' income in the early part of the period, except for new hospitals or new programs in existing hospitals. The exceptions had their budgets approved on an individual 'ad hoc' basis for the first two full financial years of their operation, and only then were they assigned to the common formulae. Of the 223 public general hospitals in operation in 1972 and included in this study, 18 were new and 205 had been in operation for some time. This section is about the larger second group, generally referred to as 'global budget' hospitals.

The approved budget for global budget hospitals was for the most part historically determined, with incremental adjustments for inflation and changes in the level of in- and out-patient activity. Allowance was made and used for additional adjustment on an 'ad hoc' basis for other factors. The description is of year-to-year changes in activity. Retrospective adjustment of the approved budget at the settlement (after the end of the financial year) was allowed for the formula portion, and to that extent the description given is of intra-year as well as inter-year adjustments. In the period up to 1972 hospitals were paid by the Ontario Hospital Services Commission (referred to hereafter as the Commission), and thereafter by the Ministry of Health (referred to hereafter as the Ministry), its successor.

Adjustment for inflation

In the period under study, explicit provision was made for the increase in prices and wages by Management Board (of the Cabinet) in the Commission/ Ministry's budget allocation passed on to the hospitals. At first all hospitals were given the same percentage increase, it being simpler for the Commission to administer the inflationary portion this way. It was realised that the financial implications for hospitals would differ, but there were sufficient additional funds in this early period to help hospitals in difficult circumstances. This situation rapidly changed. In due course the Ministry discarded the policy of the uniform increases, and each hospital was assessed on its own merits as far as this principle could be applied. The adjustment for inflation has usually been called the 'global increase' and applied to the hospitals' 'global base'. The global base accounted for most but not all of the hospitals' approved budget.

Normally the global increase was applied to the previous year's approved base, although this practice was not established until after the first year or two of global budgeting. As far as we understand what happened, the increase for 1969 was based on the projected or approved budget for 1968; in 1970 it was based on actual expenditure in 1969; and subsequently it was based on the prior year's approved base. The practice for each year was set out in the Deputy Minister's budget letter(s) to the hospitals, and there was always the possibility it would change from one year to the next. The decision in 1970 to base the global increase on actual expenditure in 1969, as against that year's approved budget, meant that hospitals that had taken care to keep within their approved budget have been penalised ever since. With this experience behind them one might expect those running the hospitals to aim for a surplus no larger than was necessary to avoid being in deficit.

In the early years of global budgeting, recommendations regarding the uniform percentage increases were made by the Salary Survey Committee. The wage increases recommended by the Committee and accepted by Management Board were projected in the first few years to be higher than for employees working outside the hospital because of the deliberate policy to reduce the unfavourable differential facing hospital employees. The policy only lasted until 1971. The recommended increases were 8.5 per cent for 1969 over 1968, and 8.5 per cent and 7.6 per cent in the two succeeding years, and were accepted by Management Board

without amendment. The increases recommended by the Committee for 1972 and 1973 were both reduced: from 7.6 per cent to 7.0 per cent in 1972, and more seriously from 7.8 per cent to 5.0 per cent in 1973 (Ontario, MOH, 1974a, 8, 9, 12 and 13). And to the extent that no additional funds were available, the hospital had to absorb part of the inflationary trend by employing fewer resources.

Up to 1973 hospitals had considerable discretion over their use of the global increase. Employees could be given larger or smaller wage increases, so long as an appropriate adjustment had been made to the hospital's resource base. As far as the Commission officials were concerned, it was largely up to those running the hospital to decide what the employees were paid. Commission officials were given salary guidelines for health professionals, but this information was used in the early years only if a hospital had exceeded its approved budget. The Committee's guidelines were not public information, and the Commission had no intention that they should be. The Ontario Hospital Association, however, collected information on wage settlements for circulation amongst its members. The fact that there were no province-wide salary scales did not discourage some hospitals from putting in claims for additions to the global increase to raise the wages of their employees still further. In 1972, \$1.2 million was approved for this purpose over and above the \$58.3 million approved for the global increase.²

In 1974 this situation changed somewhat, and in 1975 it changed once again. A new militancy among hospital workers, perhaps in response to the large cut-back in the recommended global increase for 1973, led to a situation of uncertainty as to how the inflationary component for 1974 would be handled. Pending the results of negotiations with the unions representing the general service workers and the nurses, an interim increase of 7.9 per cent was given. This proved quite inadequate. The negotiation between 13 Metro hospitals and the Canadian Union of Public Employees resulted in an increase of \$1.50 per hour, an increase of some 50 per cent for the lowest paid, to take effect over the period from January 1, 1974 to September 1, 1975. Similar increases were agreed between the nurses represented by the Ontario Nurses Association and 42 hospitals from different parts of the province over an 18 month period, and for technical staff (Ontario, MOH, 1974a, 15).

Although the hospitals recognised that the 7.9 per cent global increase was an interim measure we were told by people in and outside the

Ministry that the hospitals had no intention that the increases subsequently negotiated should have been so large. What had happened was a departure from the traditional government practice of non-interference in hospital wage negotiations. Not only had the Ministry agreed to honour the implied budget requirements for the hospitals that were party to the agreement; it had further agreed that all other hospitals should benefit equally, although what hospitals paid their employees was still an internal matter. The experience proved damaging to the government and had disastrous financial consequences. As a result, by 1977 the Ministry once again ceased to be involved, except insofar as one of its officials was present as an observer to wage negotiations. What has been said here relates to the particular situation of the hospitals. The government had also been involved on a wider front after 1974 as part of the federal-provincial anti-inflation program. The government's position in respect of 'public' employees remains a vexed one, and cannot be tackled adequately in this study.

In this context of escalating expenditure it is worth pointing out that the Ministry had more financial control in 1974 than might at first be apparent. For the first time since global budgeting had been introduced hospitals were not allowed to increase the number of paid hours, nor were those in financial difficulties allowed to pay salaries over the approved Ministry scales. There was no control over non-labour expenditures. Only hospitals that satisfied the constraints had their actual expenditure approved; those that did not had it reduced accordingly. Thus there was still a base to apply uniform percentage increases for 1975 should this have been desired.

The procedure for applying the uniform percentage increase was rather different for the 1975 budget submission. Anticipating the Ministry's guidelines, the Ontario Hospital Association approached forty hospitals and asked them what increase in expenditure they thought would be necessary to continue operating.³ About thirty hospitals replied, and increases from 15.0 per cent to 16.5 per cent were the norm. There was some variation by the size of the hospitals. Quite independently the Human Resources Branch of the Ministry⁴ had reached very similar conclusions. However, instead of issuing a uniform percentage increase to hospitals, the Ministry asked each one for the financial implications of once again working within a set of non-financial constraints. The one financial constraint was that hospitals had to reduce their global base by 2 per cent

and show how this would be done. Where no evidence was given, the Ministry's financial consultant for that hospital made a straight reduction to the base. In making their estimates the hospitals were asked to use the end-year 1974 wages and prices, and to furnish the Ministry with a breakdown of staff by type and trade union membership. The last piece of information was subsequently used by the Ministry to assess the financial implications of wage negotiations.

Predictably the hospitals varied in their percentage increases for approved expenditure, if only because the guidelines they faced were uniform in a different way. Hospitals which had requested an increase of less than 15 per cent had their submission automatically approved, but the Ministry's financial consultants still examined the submissions to check that all the guidelines had been met. Hospitals which had requested an increase of from 15.0 per cent to 16.5 per cent were usually reviewed informally by the Ministry's administrative and financial consultants for the respective hospitals. Those that had requested even more were reviewed on a line basis. Few hospitals were allowed increases of more than 16.5 per cent and then mostly only to enable them to bring their nurses' pay up to the provincial scale.

Adjustments for changes in activity

A twofold distinction was made for changes in activity that were expected to have an impact on hospital expenditure. As one might expect, hospitals in the early part of the period were given full discretion over the level of activity if the changes were thought would have only a marginal impact on their expenditure. Formulae were developed for this situation by the Commission to make appropriate adjustment to the approved budget for in- and out-patient activity. Changes which did not fit into any formula and were thought would have a significant impact on expenditure required prior official approval. These adjustments to the approved budget are discussed in turn.

Prior to the introduction of global budgeting in 1969 officials from the Commission reviewed each hospital budget on a line basis and this review determined the line budgets. Commission officials were guided in their recommendations through the use of province-wide norms. Retrospective adjustment at the budget settlement was made on a similar basis. In 1969 line review and line budgeting at the initial approval of the budget were

abandoned. However, the practice of line review continued at the settlement to determine the magnitude of any retrospective adjustment, insofar as the actual level of in-patient activity was different from the level predicted. Its continuance was recognised to be inconsistent with the aims of global budgeting (Walker, 1969), and this was one reason for its abandonment. It was replaced by the Task Force Formula in 1970.

The Formula was also introduced to ensure the success of the incentive award scheme introduced in the same year. Officials thought that the acceptance by hospitals of an incentive award scheme partly depended on the fact that none should be discriminated favourably or otherwise, and that the Formula would help to create the impression that this was the case. In the words of one official in a circular to the hospitals, the Formula aimed to obtain a 'reasonable incremental cost of caring for additional cases and additional justified days' (Clark, 1971). It was a criticism both of the Formula once it had been put into force and of the adjustment of out-patient activity that they failed to achieve this objective (Ontario, OHSC, 1971).

The Commission officials had been keen to introduce the budgetary innovations as soon as possible, once the principles of global budgeting and incentive awards had been accepted. Global budgeting was introduced in 1969. But it was not until March 12, 1970 that sufficient agreement had been reached within the Commission and between the Commission and the Ontario Hospital Association for a circular to be sent to hospitals informing them of the incentive award scheme. Hospitals were immediately eligible, and the scheme came into operation that year. The formula for in-patient activity adjustment was developed shortly afterwards and the Commission decided that it should also be applied to the 1970 budget. However, by this stage the budget year was nearly over and, to ensure acceptance by the hospitals, the Formula was only applied if it favourably affected the hospital's approved budget. The Formula was fully operational in 1971 and 1972, but for reasons of economy was only partially used in 1973. In 1973 upward adjustments were only allowed insofar as they offset hospital over-expenditure. In 1974 the Formula was abandoned completely for upward and downward adjustments.

The Formula was not only designed to make the incentive award scheme more acceptable; the Commission officials also hoped that it would encourage hospitals to improve their performance, at least with respect to the use made of beds set aside for active treatment. Hospitals were en-

couraged to increase admissions and patient-days, so long as the latter was not at the cost of delaying discharges.⁵ In the case of admissions a straight comparison was made between the actual numbers for the current and previous years. The basis for the comparison of patient-days was different. Information on the current year's actual number of patient-days was not used. Instead it was adjusted to the level it would have been if the previous year's length of stay (for defined age, sex and diagnostic groups) had prevailed. It was this adjusted current-year estimate of patient-days that was compared with the previous year's actual experience. Thus if patients in a defined group had tended to be discharged after a shorter time in the current as compared with the previous year, then the computed number of patient-days for the current year (that is the number to which the Formula was applied) would have been greater than the number actually provided. On the other hand, if patients had stayed longer, then the computed number would have been smaller than was actually provided. Insofar as the number of patient-days increased because admissions increased, full credit would have been given for them as well as for the increase in the number of cases.

Altering the number of admissions and patient-days thus changed the hospital's approved budget and could have helped it avoid a deficit and even increase its surplus. Between 1970 and 1973 part of that surplus could have been retained. Admissions could have been increased by using empty beds, discharging patients earlier, and giving preference to short stay patients. Walker (1969) anticipated that the rates of reimbursement could have been sufficiently generous to obtain such a response. The analysis given in Chapter 8 suggests that over the long term, but not within any given year, the rates so closely reflected costs that in 1972 hospitals did not improve their surplus with the Ministry in respect of the Formula. What was the design that apparently proved so successful in keeping adjustments to the budget in line with costs?

First, most but not all departments were included. Those specifically included were: short-term nursing units (wards), physiotherapy, dietary, laundry and linen, drugs, operating room, delivery room, laboratory and ECG departments, radiology, administration, medical records, house-keeping, and medical and surgical supplies. This list includes all the major expenditure-generating departments associated with hospitals providing active treatment. Second, for their salaries component, half the per-diem and per-case costs, as appropriate, were allowed; and for sup-

plies and other expenditures, the full per-diem or per-case costs, as appropriate, were allowed. Third, if the value of the adjustment had been less than \$1,000, no adjustment was made (Clark, 1971). Finally, Ministry officials had some discretion in implementing the Formula, although it is by no means clear how widely this was exercised. One senior official has suggested that no discretion was exercised, at least in 1970 and 1971:

There has been almost complete and full implementation of the internal Task Force Formula for adjustments to the global budget arising from changes in activity (increases only in 1970, both increases and decreases in 1971), primarily as the result of the insistence by the O.H.A. (Ontario Hospital Association) whereas the original plan was to make activity adjustments to budgets in a discretionary manner (Laugharne, 1973b).

On the other hand, the Chairman of the Budgets Committee has suggested that discretion was used regularly even if infrequently:

Discretion was used prior to 1973, although not to the same extent as in that year. For example, in a small hospital, where minimal staffing pertained, only the variable items such as drugs, medical, surgical supplies and food may have been used in determining the required adjustment, particularly in the case of downward adjustment (Clark, 1977).

If it is assumed that no discretion was exercised then the above outline suggests that the value of the adjustment would have been at least half the associated measure of unit costs. In fact selective evidence indicates the rate applied was considerably smaller. Data were collected from six general hospitals with 100 beds or more: three having the largest absolute increase and three having the largest absolute decrease to the budget base. The percentage ratio of the adjustment to average cost, per diem and per case, is given in Table 7.1, and did not exceed 26 per cent and 40 per cent respectively. Although these hospitals were selected because they experienced the greatest adjustment in dollar terms, and therefore might be regarded as unrepresentative, the value of the ratios were consistent with the experience of hospital administrators.

We now turn to adjustments to the approved budget for changes in out-patient activity. The procedure used prior to the introduction of global budgeting, of service charges, continued until 1972 with the rate of reimbursement depending upon the type of visit. In 1972 hospitals were reimbursed \$13 for each patient treated at its emergency department within

TABLE 7.1
Ratio of task force formula adjustment to average costs 1972 (%)

<u>Hospital</u>	<u>Per diem costs</u>	<u>Per case costs</u> ¹
1	26	40
2	23	32
3	24	37
4	22	34
5	26	38
6	17	38
Average	23	37

1 The estimate of the adjustment is based on the adjustment per case and the adjustment per diem, the latter's weight being based on the average length of stay for the hospital in question.

24 hours of an accident, including the follow-up visit(s), irrespective of the seriousness and cost of care. This level of payment was set on the assumption that it was high enough, on average, to cover the cost of care. However, if the hospital felt that it was under an excessive financial burden or even wanted to obtain a retainable surplus, cases for a few hours or overnight could have been admitted. The implied reimbursement per case and patient-day was very much higher than the \$13 paid for the emergency department visit.

Hospitals were also paid on a per visit basis for their organised out-patient clinics. The rate was \$5 in 1972, and was intended to cover the cost of nursing staff, drugs and dressings, etc. The physician could use these facilities without charge, and was paid separately by the Ministry for his services. Clinics could be held in a variety of specialities, such as V.D., ante-natal care, dietetics, and psychiatry.⁶

In 1973 out-patient activity continued to be funded separately but, instead of the approved budget being set on the basis of a fee schedule, adjustment was on the basis of the costs incurred. Hospitals were asked to submit a supplementary estimate of the incremental costs associated with any anticipated increase in out-patient activity. These submissions were received by the Ministry's financial consultants and adjustments were made if necessary. At the end-year settlement a further review was made to ensure that the forecast volume had been reached, with suitable adjustment if it had not.

A similar procedure was followed in 1974, except that the Ministry

paid only two-thirds of the claim for the agreed increase and the hospital had to find the difference. In 1975 the hospitals faced little prospect of a further increase in this source of revenue however much their expenditure had risen, and no increase in fact materialised.

Third, the approved budget was also adjusted for changes in activity that were thought would have a significant impact on the hospital's expenditure. We have in mind expenditure on new programs which, in 1972, was second only to the global increase in importance in the annual adjustment to the approved budget for the group of hospitals as a whole. Hospitals had to apply for 'new programs', submitting estimates of their cost. The programs were reviewed for their suitability by the Ministry's financial consultants and by their specialist staff in nursing, dietetics, etc., as and when appropriate. 'Suitability' was judged partly in terms of the group of hospitals (hospital centre) to which it was attached, to prevent the duplication of facilities and to create a more balanced and integrated system of health services.

Once satisfied in these respects, the proposal was subject to line review and put on a line budget for the first two full financial years. The funds allocated for recurrent expenditure became part of the global budget after the probationary period. Funds were available for the approval of new programs or the expansion of existing ones until 1972 (Ontario, MOH, 1974a, 11). From 1973 to the end of the period studied (1975) no additional programs were approved unless they had been financed by offsetting saving within the hospital's budget. New programs were still being financed, from 1973, but only if they had been previously approved.

Corresponding to new programs were measures for discretionary cuts in the approved budget. These were introduced on any scale only fairly late in the period under study (1969 to 1975). Selective bed and budget cuts were planned for 1973 and the amalgamation of some obstetric units were planned to come into effect April 1, 1973. The selective bed cuts planned for 1973 were not simply a response to a situation of financial stringency. They also reflected the inclusion of nursing home care within the provincial health insurance program as from April 1, 1972. The target active bed to population ratio was reduced from 5.0 beds per 1,000 persons to an interim level of 4.5, to fall eventually in Southern (but not Northern) Ontario to 4.0. No serious attempt was made to close hospitals, and recommended bed cuts tended to be done on a unit (ward) basis.

The bed cuts were intended to be directed at active treatment bed provision, and it was accepted that alternative types of provision might be expanded to facilitate this transition. For example, provision of convalescent self-care, chronic patients, and out-patients might all be increased. The reduction of the latter group of services was not intended as a means to finance the cuts intended for active treatment (Martin, 1972a). Nevertheless, hospitals interpreted the cuts otherwise. They saw the intention to be one of budget cuts rather than bed cuts for active treatment, and in many cases alternative measures to obtain the equivalent budget cuts were eventually accepted by the Ministry.

No serious attempt is made here to evaluate the Ministry's success in carrying out the proposed bed cuts. However, such evidence as we have suggests that some positive results were achieved. The data refer to the public general hospitals. In each year from 1971 to 1975 there was an increase in rated bed capacity for the province as a whole, even for active treatment, except for 1973. In 1973 there was a small net reduction.⁷

Selective budget cuts were also proposed, and were designed to secure greater uniformity of resource provision between hospitals. A mass of data existed to make this comparison, much of it overlapping in its coverage: the OHA Consolidation, Forms HS-1 and HS-2, and the budget forms; and the experience of the incentive award scheme. But unlike the bed cuts no guidelines were publicly available on, for example, the number of nursing hours per patient-day to help the Ministry enforce the proposed budget cuts.

The proposals to amalgamate obstetric bed units were more firmly based. Data were available on bed use and on the ability of the fewer remaining units to handle the increase in volume of care they would have to provide. The intention was not merely to close obstetric units. Hospitals were explicitly prohibited from using the freed beds to provide more active treatment. However, on this occasion the Ministry was open to suggestions of other ways the hospitals could make equivalent cost savings (Martin, 1972b). According to hearsay evidence, hospitals often took this latter course of action.

The description so far has focused on the proposals made for 1973. Although the events now described lie outside the period under study, it is perhaps of some interest to outline the outcome of similar cuts that were planned for 1976. They had much the same success. It was greatest for the bed cuts, which were geared once more to the province's bed guide-

lines. In all, 37 hospitals were to have cuts effecting a cost-saving of \$15 million (Ontario, MOH, 1976a, 94). Much less successful was the initial proposal to make budget cuts to 69 hospitals, planned to save the Ministry another \$15 million (ibid., 94). Finally, for the first time there was an attempt to close some hospitals. Nine⁸ were selected and their closure would have saved a further \$10 million. This last strategy was the least successful, in that no closures were effected. However, four continued operation at a reduced cost to the Ministry: two as nursing homes and two as clinics. In all, the savings made were some 1.75 per cent of the hospitals' resource base (W.A. Backley, personal communication) instead of 2.3 per cent as planned (Ontario, MOH, 1976a, 95).

So far, attention has focused on the regular mechanisms for adjusting the approved budget in the period 1969 to 1975. In addition, there were a series of 'ad hoc' measures. No attempt is made to give an exhaustive review of them, but a few illustrations may indicate their flavour. Some were designed for all hospitals. For example, the attempt to reduce the hospitals' approved budgets in the period April 1, 1973 to March 31, 1974 was achieved by reducing them by an amount equal to 60 per cent of the hospitals' approved depreciations for the previous year. Another example is the allowance made to the approved budget for the introduction in 1972 of universal unemployment insurance. Other measures were applied on an individual hospital basis. Requests to raise wages among the lowest paid is one such example.

The various adjustments to the approved budget have been described. The remainder of this sub-section is devoted to indicating their magnitude. The period covered is the change in the approved budgets between 1971 and 1972. The data refer to the 205 public general hospitals that were on a global budget in 1972, and omit the 18 that were on line budgets. The adjustments identified were in descending order of importance: the global increase (\$57.2 million); new programs (\$10.7 million = \$11.9 million for increases minus \$1.2 million for decreases);⁹ change in out-patient activity (\$8.8 million = \$9.2 million for increases minus \$0.4 million for decreases); Task Force Formula (\$4.9 million = \$6.4 million for upward adjustments minus \$1.5 million for downward adjustments); the introduction of universal unemployment insurance (\$2.9 million); and exceptional salary increases (\$1.2 million). These items alone increased the approved budgets by \$85.7 million.

On the face of it, one might have expected actual expenditure to have

increased by a similar amount, if not by more. In fact it increased by only \$72.3 million. What accounts for the discrepancy of \$13.4 million or more? No major cuts in the approved budgets have been omitted. Such cuts were occasional events in 1972 and we believe they have already been taken into consideration. The explanation must simply be that hospitals failed to take full advantage of the opportunity to increase expenditure. The exceptional salary increases would have been known only during the course of the financial year; the final adjustments for changes in in- and out-patient activity, including new programs would have been known only after the financial year had ended. These four items added the \$25.6 million to the approved budget, and the underspending of \$13.4 million should probably be related to them. Apparently in the presence of uncertainty, hospitals underspent nearly \$1 for every \$2 finally approved.

Data on the magnitude of some of these adjustments for individual hospitals are now presented. Attention is given to the adjustments for changes in in- and out-patient activity, and new programs. Data on new programs indicate that two hospitals had a substantial cut. Cuts due to the other two adjustment formulae were rather more frequent. The data are presented in Table 7.2 for their absolute value, and in Table 7.3 as a percentage of the final approved budget in 1972.¹⁰ In the last context it should be remembered that the global increase for 1972 for inflation was 7 per cent. Since the global increase corresponded to \$57.2 million and actual expenditure rose by \$72.3 million, then the real resource base on average increased by some 1.8 per cent.

Before moving onto the next section it is important to note that the hospital's relationship to the Ministry, through its participation in the provincial health insurance plan, is but one way the hospital can influence its financial status. Insofar as the federal government, Workmen's Compensation Board, and uninsured persons make use of its facilities, they also have to share in the finance of its operation. In addition, most hospitals have alternative sources of income which the Ministry did not deduct in the calculation of its own contribution. They are donations, contributed services, investment income, and, in 1972, half the differential charges for private and semi-private accommodation. Data on their importance in relation to the hospital's total budget are given in Table 7.4. Their mean values in 1972 were 0.16 per cent from donations, 0.01 per cent from contributed services, 0.27 per cent from investment income and

TABLE 7.2
Adjustment to the approved budget, 1972 (\$)

	Task force formula	Increase out- patient revenue	New pro- grams	Task force formula	Decrease out- patient revenue	New pro- grams
No change	69	20	119	-	-	-
Some value but less than \$5,000	3	15	11	2	8	1
\$5,000 but less than \$10,000	16	17	8	6	3	0
\$10,000 but less than \$20,000	15	26	12	16	1	0
\$20,000 but less than \$50,000	27	58	21	15	2	0
\$50,000 but less than \$100,000	5	22	10	4	0	0
\$100,000 and over	25	31	21	2	2	1
Data missing	0	0	1	0	0	-
N = 205	160	189	203	45	16	2

TABLE 7.3
Adjustment to the approved budget as a percentage of hospital income,
1972 (\$)

	Task force formula	Increase out- patient revenue	New pro- grams	Task force formula	Decrease out- patient revenue	New pro- grams
No change	69	20	119	-	-	-
Some value but less than 0.5%	15	26	22	12	9	1
0.5% but less than 1.0%	22	29	23	11	4	0
1.0% but less than 2.0%	31	74	18	13	2	0
2.0 but less than 3.0%	17	18	8	9	0	0
3.0% and over	6	22	12	0	1	1
Data missing	0	0	1	0	0	-
N = 205	160	189	203	45	16	2

TABLE 7.4

Percentage distribution of hospitals according to the importance of the sources of non-deductible income as a proportion of total income, 1972 (%)

	Donations	Contributed services	Invest- ment income	Differ- ential charges	All sources
No change	138	195	127	3	1
Some income up to 0.5%	50	3	47	8	3
0.5% but less than 1.0%	7	2	12	41	24
1.0% but less than 2.0%	4	0	11	111	107
2.0% but less than 3.0%	0	0	1	30	45
3.0% and over	1	0	2	7	20
Missing data	5	5	5	5	5
N = 205	205	205	205	205	205

1.50 per cent from differential changes, making 1.95 per cent¹¹ for their combined effect.

Global budgeting

It is one thing to set an approved budget; it is another to decide how much freedom those running the hospitals have to spend it. The description of the global increase given above indicated that in the early part of the period under study those running the hospitals were allowed to set wage and salary scales of employees. Probably there was nothing new in this particular feature when global budgeting was introduced in 1969. The novelty the Commission had in mind is indicated by the following quotation, which indicates its interest in how the budget was spent:

While its approved budget will have formulated a very definite programme of expenditure, so long as the total amount of money assigned is not overspent the Commission will not take exception to changes from the budgeted method of spending which the hospital may decide to institute during the year, provided that substantially the proposed programme of hospital services is carried out. This freedom to make changes is conditional on the substituted expenditures being classified as allowable operating costs. The Commission will submit a statement of policy regarding non-allowable in the

very near future. (Ontario, OHSC, 1970a, 1-2)

Global budgeting was introduced in 1969 by the Commission. My discussions with officials involved in determining policy at that time identified three reasons for the change. First it gave the administrator more discretion and responsibility in running his hospital and the community greater scope for local initiatives. Second, in particular, it was felt that rigid control over cost centres did not make too much sense given the growth of unionization in the hospital sector and that it would be easier to negotiate wage settlements for sectional interests when there were fewer financial constraints to satisfy. Withdrawing line budgets gave hospitals greater scope to switch funds to meet unexpected wage and price changes and, if necessary, to make matching changes to the resources employed. Third, there was a concern to contain costs, and it was thought that line budgeting exacerbated this trend. How valid were these reasons in practice? We consider the last reason first, and then go on to consider whether the cost centres associated with line budgeting were such a constraint compared with global budgeting that followed it.

It was not clear from discussions with officials how global budgeting would contain costs. One answer is the identification made by the Deutsch Committee of the 'global increase' with global budgeting (Ontario, MOH, 1974a, 5). Possibly it was hoped that, by handling the inflationary trend explicitly, 'real' changes could be more easily controlled. But this explanation is not entirely satisfactory. Hospitals were allowed to expand their resource base without limit for out-patient care, and in-patient care could also be expanded insofar as the existing bed provision allowed this. So long as the expansion of the resource base had been matched by an increase in activity and actual expenditure did not exceed its approved budget, the hospital would have been fully reimbursed for any additional outlay.

Even if it is doubtful whether the global increase contained costs, nevertheless, global budgeting may have given those running hospitals more freedom to switch funds. Did this happen in practice? The first point to be clear about is that certain activities were excluded from the global budget. Some were excluded because, by their very nature, they were not suited to the application of the global increase to adjust for changes in wages and prices. New programs are one obvious example, because adjustments to the quantity of resources initially allocated would

often have been desirable. New programs were, therefore, on a line budget for the first two full years of their life to allow this to be done. Only then were they added to the global portion. The most common remaining items that were also excluded are education, home dialysis and alimentation, and laundries. Education had its own global budget. Home dialysis and alimentation were on line budgets. And, in the case of hospitals participating in central laundries, the principal, interest, and depreciation were excluded from the global budget, although other laundry costs were included within it. The items that did not 'come within the formula' were on line budgets to facilitate an equitable annual adjustment of the hospital's financial commitment.

Finally, the Management Board earmarked part of the funds allocated to the health services for specific purposes. In 1976 there were six such specific purposes (Ontario, MOH, 1976b):

- psychiatric out-patient, medical salaries,
- respiratory diseases, medical salaries,
- ambulance costs (net),
- children's mental health service,
- detoxification centres,
- municipal taxes.

The global base referred to in-patient care. But although out-patient income, like the line items, was excluded from the global base, unlike the line items, no restriction was put on how it was spent. The restriction on hospitals was therefore much less than the ratio of the global budget base to total hospital income would suggest.

No direct evidence on the magnitude of the controlled expenditures is available. Municipal taxes were probably exceptional in this group of line budgets for affecting all hospitals. New programmes were probably much more typical in being an occasional item with a small magnitude relative to total hospital income (Table 7.3). Even collectively, the magnitude of line budgets was probably relatively small.

Line items became less important after 1972. For example, no new programmes were approved after 1973, although approvals prior to that date were still being honoured. In addition, the first two years of nursing education ceased to be financed from the hospital's budget. On the other hand, it should be noted that the Ministry added non-financial

controls. For example, hospitals were not allowed to exceed the number of reimbursable manhours beyond their end-year 1973 level although the administrators were still free to reallocate that total between departments. In conclusion, despite the existence of several constraints, global budgeting probably allowed public hospitals almost complete discretion over allocation of funds between approved activities in the period 1969 to 1975.

Was line budgeting any more successful in controlling the allocation between approved activities than global budgeting had been in granting this freedom? Such information as we have reflects post-1969 experience. Nevertheless, arguably it provides a suitable basis for comparison with global budgeting. Line budgeting was only regularly (in this case annually) practised for private hospitals. Public hospitals were only on line budgets for the whole of their budget if they were new; otherwise line budgeting was limited to that portion set aside for new programs if they had any. The public hospitals remained on a line budget for the first two full budget years, after which the financial constraints were removed. Occasionally hospitals were reviewed at their own request if, for example, they were in, or anticipated being in financial difficulties. But they would not normally have been put on a line budget.

In several respects line budgeting meant much the same thing for public as for private hospitals, even if for the former it was an occasional and for the latter a regular event. Both had more or less the same set of budget forms to complete, whose cost centres were based on the department. Two of the nineteen such departments in 1976 were nursing and dietetics. There was also a measure of control over the allocation within the department, but it was only between salaries and supplies and other expenses (Ontario, MOH, 1976b). Thirty-eight cost centres may seem a large number, but the two largest departments in 1974, nursing and general administration, accounted for 34 per cent and 13 per cent, respectively, of the running costs of the public hospitals, and most of that expenditure was on salaries (Ontario, MOH, 1974b, 112). This left a residual 53 per cent to be split between seventeen departments. However even this residual may have been subject to less control than is apparent. Some staff attached to one department could have performed functions done by staff in a second department. Thus if there were a conflict of interests between the Ministry and those running the hospital, the interests of the latter would probably prevail. If this had been the case, then abandoning line control for the public hospitals in 1969 probably did not greatly in-

crease the discretion allowed the administrators.

Finally, we turn to two quite different points, although both are related to the line/global budgeting dichotomy. First, line budgeting has been intimately associated with line review in Ontario. By line review is meant the review line-by-line, or in the case of Ontario department-by-department, of the hospital's budget submission. If the hospital is to be held to a line budget, it is only reasonable that the budget should have been previously reviewed for its suitability; otherwise one might find surpluses for some lines that could justifiably have been spent on other lines. Line review is less obviously necessary when there are no constraints on the transfer of funds between cost centres, especially if there is some confidence that a 'reasonable' base had already been set. It was therefore hardly surprising that the line review of the budget submission was abandoned with the introduction of global budgeting. The subsequent recommendation by the Deutsch Committee for review every three or four years (Ontario, MOH, 1974a, 26) suggests that this confidence has since evaporated.

Second, only established public hospitals had the opportunity to go onto global budgets. New public hospitals or new programs at existing public hospitals continued to be put on line budgets. Private hospitals remained on line budgets whether or not they had a new program. Several reasons were given for the different treatment of private hospitals. First, there were comparatively few of them, so that leaving them on a line budget did not generate much additional work for the Commission officials. Second, the Commission did not have the same commitment to keep private hospitals solvent and it was 'just bad luck' for them if line budgeting created financial problems. This unsympathetic attitude was undoubtedly influenced by the fact that private hospitals are usually owned by physicians who could benefit financially from their use. Finally, private hospitals were only allowed a limited rate of return on capital invested, and line budgeting helped the audit process.

Ministry financial responsibility

It was pointed out earlier in the chapter that hospitals in Ontario received funds from several sources. Nevertheless, the dominant source of finance was channelled through the Ministry, even to the extent of covering the hospitals' bad debts. In 1972, 200 of the 223 public general hospitals had

bad debts which were covered this way. The Ministry reimbursed expenditures provided that their total was within the approved budget. The hospital could influence its approved budget (and hence reimburseable expenditures) in a regular way in the early 1970s only by altering the level of in- and out-patient activity.

Prospective (dis)incentive reimbursement is therefore implied. In the period under study hospitals that exceeded their approved budget had to finance the whole of the difference as their penalty. They were allowed to retain part of any underspending as their award, but only between 1970 and 1973. This incentive award scheme is briefly described.

Ministry officials had reasonably firm guidelines to determine the level of the approved budget and what activities were allowable. Nevertheless, discretion was exercised in deciding whether a penalty should be imposed or an award given. This discretion was exercised only at a senior level. During the period of the Commission it was the Executive Committee that gave this approval. Under the Ministry approval has had to be obtained by the Executive Director of the Institutional Division, and even then referral might be made to the top-level Management Committee of the Ministry. In 1972, nine of the 22 public general hospitals on a global budget and with a significant deficit with the Ministry had their penalty waived. In the same year, of the 176 with a significant surplus, nine had their award disallowed. Two of this second group of hospitals never participated in the incentive award scheme. In the case of Princess Margaret Hospital it was at the wish of its own board. The Clarke Institute was excluded because it was not financed under the federal cost-sharing scheme, HDSA, but rather has been a provincial responsibility.

Ontario first participated in the federal hospital insurance scheme in 1959, and to the best of my knowledge prospective budgeting was introduced at that time. However the incentives implied were only negative, in the sense that hospitals were expected to pay in full any excess of actual expenditure over their approved budget. By the mid-1960s officials in the Commission considered that the incentive scheme might be supplemented by financial awards to hospitals that spent less than the budget approved at the settlement. A recommendation to this effect was made by one of the Commission's economic consultants in 1965 (Verbrugge, 1965), and was endorsed by the Commissioner of Finance the following year (McGavin, 1966). However, it was some years before the scheme eventually adopted

was put into operation. The earliest recorded meeting of the joint Commission/Ontario Hospital Association Working Committee on Incentive Programme for Hospitals took place on October 21, 1969. Several joint meetings, and meetings restricted to Commission officials, were held in quick succession and resulted in the incentive award scheme being first publicised in a letter to the public hospitals, dated March 12, 1970, sent by the Commissioner of Finance (McGavin, 1970). Included with the letter was a description of the incentive program. The purpose of the program was 'to provide a financial reward to the hospital which is able to improve upon expected results, hopefully by means of systems which will make its operation permanently more efficient' (Ontario, OHSC, 1970a, 1).

The scheme was put into effect for the budget year 1970, and lasted until 1973 when it was suspended. Some payments continued, but only to honour existing commitments. The scheme was introduced to encourage hospitals to reduce their operating costs, and was restricted to public general hospitals on a global budget. The awards could be spent at the board's discretion: for example, even on new programs if prior approval had been obtained from the Ministry. Three types of incentive awards were given: 'continuous', 'one-time', and 'capital' incentive awards.

'Continuous' awards were available to hospitals that spent less than the final approved budget and expected the 'savings' to continue indefinitely. The hospital could have taken the 'continuous' award in one of two forms.¹² One was to have the approved budget in the following year reduced by the full amount of the shortfall experienced, but still allowing the hospital to retain 90 per cent of the value of the shortfall as an award.

Alternatively, the hospital could have had the approved budget reduced by a smaller amount, but have also received a correspondingly smaller award. The value of the award depended upon how much actual expenditure was less than the approved budget. For the first 0.5 per cent difference, the award given was 75 per cent of that part of the shortfall. The proportion returned increased to 90 per cent for that part, if any, of the shortfall in excess of 1.5 per cent of the approved budget. Taking the 'continuous' award in this form meant that the budget was not reduced by the full amount of the shortfall claimed, as under the first alternative, but had 60 per cent of the award given that year reinstated for the following year's budget. A hospital that maintained its performance of the first year would accumulate over a six-year period awards

whose present value varied from 126 per cent to 175 per cent, depending on the size of the shortfall, with a 10 per cent annual discount rate. This is, of course, larger than the 90 per cent awarded for the first alternative, which moreover required the approved budget to be reduced by the full amount in the first year and not gradually over succeeding years. Those running the hospitals were aware of this choice and, when they opted for a 'continuous' award, invariably chose the second alternative.

Hospitals that had taken a 'continuous' award, but found that the 'savings' were not permanent, could have had their budget bases restored to their original levels, provided that the awards were returned. This was an important safeguard, because hospitals could have obtained an alternative award without having their budget base reduced at all. This type of award is now described.

'One-time' awards were the second type of award and, like 'continuous' awards, they were given to hospitals that spent less than their approved budget. Their value was only 10 per cent of the shortfall, but the hospital's approved budget was not reduced in succeeding years. If the shortfall lasted six years, its accumulated awards had a present value of 48 per cent of the shortfall claimed, using a 10 per cent annual discount rate. This return is much smaller than either form of the 'continuous' award.

Hospitals were asked by the Commission to indicate shortly after the initial budget approval, and certainly before the budget settlement, any anticipated surplus which they thought would be of a permanent nature. Any other shortfall was presumed to be temporary. Hospitals with a permanent surplus were expected to choose a 'continuous' award in one of its two forms. The 'one-time' award was designed to discourage hospitals from spending any temporary surpluses. It could be argued that the hospitals complied with this arrangement when the scheme was first introduced. Thus as of September 1970, shortly after the hospitals had been informed of the scheme, only 14 of the first 63 to state their preference opted for a 'one-time' award: 49 preferred a 'continuous' award, with only one taking the option of the immediate return of 90 per cent of the surplus (Ontario, OHSC, 1970b).

However, only a few months later the attitude of the hospitals to the incentive award scheme changed radically. In 1971 the 'continuous' type was chosen by and given to only eleven hospitals.¹³ In 1972, 167 of the 205 hospitals obtained a surplus for which an award was given, and all of

them took it in the 'one-time' form, although one took part of the surplus obtained as a 'continuous' award.¹⁴ Although the 'one-time' awards gave less generous benefits in the short run, the approved budget was secure. Evidently those running the hospitals had either suddenly realised this fact, or they thought that they were faced with a new financial situation where other measures to adjust the approved budget upwards would no longer be available.

At the time of the 1971 budget none of the budget guidelines indicated a threat to the hospital's budget base. However, subsequent events indicated that those running the hospitals were right to have been cautious, and a hint of things to come may well have permeated from within the Commission to those at the hospitals. In 1972, the following year, Management Board first cut the Commission's recommendation for the global increase, admittedly only from 7.6 per cent to 7.0 per cent, but a precedent had been set. In 1973 Management Board cut the recommended increase much more severely. At the same time no upward adjustments to the approved budget for increases in in-patient activity were allowed, except for hospitals that would otherwise have exceeded their budget. And finally, 1973 was the last year funds were available for new programs.

The comments made so far about the incentive award scheme relate to the attitude of those running the hospitals towards the prospect of a budget surplus with the Ministry. Since 1971 they overwhelmingly chose to treat the surplus as temporary.

An indication is now given of the importance of 'one-time' awards in 1972. In Table 7.5 information is given of their value. Data on the penalties imposed on the hospitals with a deficit are given in the same table. As has already been noted nine of the 205 hospitals on a global budget in 1972 had a significant surplus with the Ministry for which no award was given, and nine had a significant deficit for which no penalty was imposed. These eighteen hospitals are included in Table 7.5 as are the seven others whose surplus/deficit position with the Ministry was too small to be worth consideration. The mean value of the 'one-time' award/penalty for all 205 hospitals was \$12,100 and the corresponding standard deviation was \$30,300. At the extremes, an award worth \$294,000 was given and a penalty of \$120,000 imposed.

Although the absolute magnitude of the awards and penalties for several hospitals may seem very large, in fact they were usually only a very small fraction of the hospital's total income from the Ministry. Data

TABLE 7.5
Distribution of hospitals with 'one-time' award and penalty by value, 1972 (\$).

	Award		Penalty	
	No.	%	No.	%
No award/penalty	25	12.2	-	-
Some value but less than \$ 5,000	55	26.8	4	2.0
\$5,000 but less than \$10,000	37	18.0	1	0.5
\$10,000 but less than \$20,000	35	17.1	1	0.5
\$20,000 but less than \$50,000	29	14.1	5	2.4
\$50,000 but less than \$100,000	9	4.4	1	0.5
\$100,000 and over	2	1.0	1	0.5
N = 205	192	93.7	13	6.3

TABLE 7.6
Distribution of hospitals by 'one-time' award and penalty as a proportion of total income, 1972 (%).

	Award		Penalty	
	No.	%	No.	%
No award/penalty	25	12.2	-	-
Some value but less than 0.5%	92	49.8	4	2.0
0.5% but less than 1.0%	66	27.8	3	1.5
1.0% but less than 2.0%	9	3.9	3	1.5
2.0% but less than 3.0%	0	0.0	2	1.0
3.0% and over	0	0.0	1	0.5
N = 205	192	93.7	13	6.3

relating 'one-time' awards/penalties to the hospitals' total income are shown in Table 7.6. More than half either had no 'one-time' award/penalty or its value was worth less than 0.5 per cent of the hospital's income. Less than 10 per cent had an award/penalty which was worth 1 per cent or

more of the hospital's total income. The mean value of the combined 'one-time' award/penalty expressed as a proportion of the hospitals' total income was 0.27 per cent and the corresponding standard deviation was 0.59 per cent. It is also worth remembering that the hospitals' non-deductible income in the same year had a mean value of 1.95 per cent, more than seven times the value of the award/penalty.

The third type of award available was the 'capital' incentive scheme.¹⁵ This type of award had the same object as 'one-time' and 'continuous' awards, namely, to reduce hospital expenditure. However, whereas the 'continuous' awards were designed to stimulate cost savings through internal reorganisation, the 'capital' awards recognised that more than this is sometimes necessary. The Commission only allowed capital expenditures that were self-financing, in the sense that the interest and principal could be paid from the cost savings generated. The hospitals had to provide information to the Commission, and its successor the Ministry, to satisfy it in this respect. Once approval was given, the hospital reclaimed the cost incurred from the cost savings generated for a negotiated period. The period usually negotiated was not more than five years, although it could have been longer. Any surplus in excess of that claimed was eligible for a 'one-time' or 'continuous' award; but if the cost saving was less than that claimed, the hospital was normally only allowed the smaller amount. After the negotiated period had ended the approved budget was reduced by the claimed cost savings, and any shortfall in the recovery of capital outlay and interest paid had to be financed from the hospital's own funds.

The unattractiveness of the 'capital' incentive scheme is most evident when compared with the alternative of using capital funds to promote new programs. First of all, the object of 'capital' incentive schemes was to reduce recurrent expenditure by cutting back on resources employed. New programs, in contrast, have allowed hospitals the more attractive opportunity to expand their resource base. But even if hospitals feel they must improve their performance, their financial risk from a 'capital' incentive scheme was probably greater than from a new program. The 'capital' incentive scheme not only reduced the hospital's budget if successful, but the hospital bore in addition the cost of that part of the financial outlay that was not recovered from cost saving achieved during the negotiated period. If the hospital's capital funds had, instead, been set aside for a new program, then the hospital's outlay may well have seemed smaller to

those running the hospitals. The outlay was limited to one-third of the cost of construction and related equipment and the interest charges, if any, associated with the purchase of hospital specific equipment. Meanwhile the uncorrected inferior performance continued to be reimbursed in full as part of the hospital's allowable operating costs.

All in all, it is not surprising that few hospitals took advantage of the 'capital' incentive scheme. In 1972 only four received an award and, as far as we can judge, only one was given for the first time that year. The remaining three were continuing payment for investments made some time earlier. Such proposals as were put forward by the hospital were typically boiler conversions whose financial costs and benefits were both well defined and offered a strong likelihood to reduce operating costs.

The Commission's, and subsequently the Ministry's, experience with the incentive award scheme as a whole was a disappointment. Shortly after its introduction the hospitals overwhelmingly preferred to regard any surplus with the Ministry as temporary, and few appeared to have made a deliberate effort to run operations with fewer resources. In 1973 the Ministry took more direct action to reduce recurrent expenditure when it instructed particular hospitals to cut their budgets and bed provision and, in some cases, to amalgamate their obstetric units. Eventually the incentive scheme, at least in respect of 'one-time' and 'continuous' awards, was suspended in 1974. The 'capital' incentive scheme was also suspended in 1974, presumably because of the hospitals' lack of interest.

But there was a further reason for the suspension of the incentive award scheme. When it had been introduced the commission officials had anticipated that payments would be shared with the federal government under the Hospital Insurance and Diagnostic Services Act. The law was not explicit in this respect, but officials in Ontario felt it was only a matter of time before recognition was given to the scheme. The recognition never materialised. As a result the federal government disallowed \$2.2 million in 1970 and \$3.6 million in 1971 (Laugharne, 1973a). The commission officials were well aware that had the scheme been effective it could still be justified even if the cost of the awards were not shareable (Walker, 1970). However, by 1973 there was the general feeling in the Ministry that its effectiveness was in question. Its suspension would have seemed inevitable.

Summary and some comparisons with American schemes

Hospital reimbursement in Ontario has continuously changed. In order to understand hospital response to particular features of its reimbursement scheme we have therefore concentrated on the period from 1969, when 'global budgeting' was introduced, to 1975.

Except for the few new hospitals, the hospital's approved budget was determined incrementally, each year's being related to the previous year's actual expenditure or its approved budget. In descending order of importance for the increase in the approved budgets from 1971 to 1972 were: global budget increases for inflation, new programs, and adjustments for changes in out- and in-patient activity. With the exception of new programs, all changes used common formulae. New programs were the only adjustment, made on a regular basis, which used a discretionary 'ad hoc' approach, with each hospital reviewed in an individual way. New hospitals were also reviewed in an individual way for the first two years of their operation.

The formula approach had only a brief history. By 1973 it had been abandoned for out-patient activity, and in the following years it was abandoned for in-patient activity. Uniform percentage increases for inflation were last given in 1973. Thereafter recognition was given of the employment mix of staff.

The method by which the approved budget was set in the early part of the period for the majority of individual hospitals in Ontario is only superficially different from the per diem cost targets used by the five American schemes reviewed in Chapter 6. The Ontario scheme, like them, implied per diem (and per out-patient) targets, even though at the settlement an overall approved budget was determined.

The Ontario scheme set the approved budget for effectively the whole of the hospital's income. This contrasts with upper limits of some 60 per cent to 70 per cent found in the sample of five schemes reviewed in Chapter 6 (Table 6.2). Hospitals in Ontario were allowed to keep from 10 per cent to 90 per cent of the underspending in any one year. Taking only 10 per cent resulted in no long-term adverse consequences to the approved budget and this choice was almost universal within months of the incentive award scheme's introduction in 1970. The incentive award scheme lasted only until 1973. By way of contrast, the penalties from overspending were in force in Ontario throughout the period 1969 to 1975.

Hospitals there had to finance the whole of any overspending, with no likelihood that the approved budget would be revised upwards in subsequent years. Taking the short- and long-run financial consequences of the scheme, the Ontario scheme imposed marginal incentives quite as strong as any of the five American schemes reviewed in Chapter 6 (see Table 6.2).

The approved budget in Ontario in the early part of the period was largely determined by arbitrary formulae. Nevertheless, some scope was left for 'ad hoc' adjustments, both in the course of setting the approved budget, initially, and at the final settlement after the end of the financial year. The example cited as regularly used in setting the approved budget, initially, is new programs. In 1972 adjustments were also made for the introduction of universal unemployment and to allow the low-paid exceptional salary increases. Some of these 'ad hoc' adjustments might have been made during the financial year. In addition, at the budget settlement the final approved budget, which depended largely on the application of formulae for its determination, was not always rigidly adhered to in deciding how much the hospital would be reimbursed. Thus in 1972 nine of the 22 hospitals that apparently significantly overspent their approved budget had the difference covered by the government; and in the same year another nine of the 176 which had significantly underspent their approved budget had such an award as they might have expected to receive forfeited. And again, in that year the government invariably covered such bad debts as the hospitals had. In 1972 some 200 of 223 had bad debts.

It is not known how rigidly the prospective budgeting schemes were adhered to in the four jurisdictions reviewed in Chapter 6. But on all other counts for which comparisons can be made, the Ontario scheme seems to have adopted all the best features of these schemes. This gives some cause for believing that such success as the American schemes had in getting the hospitals to meet their financial targets could also have been obtained in Ontario during the early 1970s.

Our predictions are based on the straight comparison of differences in schemes. Yet similar schemes in America and Canada could have different results because they operate in different environments. This latter possibility was explored in chapter 3. One source identified is the finance of capital expenditure. Hospitals in America had less access than hospitals in Ontario, in the first half of the 1970s, to public funds. Hospitals in

America therefore had to rely more on other sources. Of direct assistance is internal finance from net income. In addition, internal finance facilitates external (commercial) borrowing. Hospitals in America, therefore, may have taken prospective reimbursement more seriously than their counterparts in Ontario, even though the design of schemes in America gave them less incentive to do so.

NOTES

- 1 Dowling (1974) and Cleverley (1979) provide a more detailed taxonomy.
- 2 For information on the sources of these data see Appendix A.
- 3 It should be mentioned in this context that for some time the Ministry (and before it, the Commission) and the Ontario Hospital Association have had joint committees to resolve common problems. The relevant ones at this time were the OHA/Ministry Liaison Committee and the Financial Advisory Committee.
- 4 This body took over the role of the Salary Survey Committee of the Commission.
- 5 A very full and complete description of the adjustment mechanism is given in Ontario, OHSC (1972, 1-103), particularly pages 46-52.
- 6 Hospitals had a three tier price system for out-patient care in 1972. The third was for sessions in speech therapy, radiotherapy, physiotherapy, occupational therapy and inhalation therapy. Hospitals were paid \$3.50 per visit to cover all their costs including the therapist who would have been in their employ.
- 7 The basic data are taken from the Ontario annual Hospital Statistics. Since 1973 a special table has been presented giving a breakdown of changes in rated bed capacity.
- 8 Estimates of the number of hospitals to be closed vary from 8 to 10 (Ontario, MOH, 1976a, 44-61, 94 and 95).
- 9 Data on one hospital are not known, and the estimates refer to the remaining 204. The hospital is a small one of approximately 60 beds, and the omission only marginally influences the magnitude discussed in the text.
- 10 The latter is the 'gross allowable cost adjusted', as defined in Appendix A-section B, and is a measure of the payment made by the Ministry for all approved activities, without distinction between in- and out-patient care.
- 11 $1.95 \neq 0.16 + 0.01 + 0.27 + 1.50$. Each of the five statistics was separately estimated.
- 12 Details are taken from Ontario, OHSC (1970a, 8-9).
- 13 This information was collected from Form A-1, line 49, for 1972, from the Ministry's files.
- 14 This information was collected from Form FC-001, for 1972, from the Ministry's files.
- 15 Details describing this type of award are taken from Ontario, OHSC (1970a, 5-7).

Introduction

The main purpose of the analysis of American hospitals in Part II was to identify whether hospitals responded to financial incentives in the particular context of prospective reimbursement. We found that, depending on the design of the scheme, per diem cost targets reduced per diem costs and/or per diem cost inflation, as predicted. Per diem cost targets also reduced case costs, total expenditure, and their changes over time, although none of these outcomes could have been predicted.

Ontario's scheme in the early 1970s had all the best features of the American schemes and hospitals in Ontario might be expected to have been just as responsive to financial targets as their American counterparts. The modification to this conclusion is that hospitals in Ontario had less incentive to meet their financial targets because they relied less on non-public sources to finance their capital expenditure. Nevertheless, it seems reasonable to assume that the financial target also mattered to hospitals in Ontario.

Financial targets have short- and long-term dimensions. In the short term hospitals must cover costs. In the long term hospitals need access to funds to finance capital expenditure in order to make good wear-and-tear and obsolescence and to increase their resource base. In this chapter we explore how far hospitals used the prospective incentive scheme to achieve these ends during the first half of the 1970s. The analysis is done in two parts. The first looks at the hospital's budget constraint. It is evident from chapter 7 that hospitals do not have the same willingness and ability to respect it, with self-evident consequences for their net asset position. The second part looks at the two most obvious ways open to hospitals at that time to alter their net asset position, namely to change the levels of

in- and out-patient activity. Separate sections are given over to the analyses of these two dimensions of hospital activity.

The budget constraint

The budget constraint is defined in its conventional economic sense to be the funds available to finance recurrent expenditure. In America the financial target under prospective reimbursement has typically been defined in terms of a unit of throughput, most commonly the patient-day. The budget is therefore the product of the target and the number of patient-days. Ruchlin and Rosen (1981) have pointed out in their study of the New York scheme that the financial target can and has been changed frequently within any given financial period, in this case twelve months, with the result that hospitals may not know their budget with certainty until they are well into their financial year, or after its end. A similar situation has been present in Ontario too. To avoid ambiguity the financial target is therefore measured in terms of the budget finally approved at the settlement. The data set studied is for the financial year 1972.

The choice of 1972 implies that hospitals might view their achievement of the target in one of the two following possible ways. The first refers to the extent that expenditure fell short of or exceeded the finally approved budget, the hospitals' surplus/deficit (SD). The second refers to the financial implications of that surplus/deficit: namely, the award received or penalty imposed (AP). AP differs from SD in that the financial awards of hospitals in surplus in 1972 were invariably taken in the 'one-time' form and were worth 10 per cent of the surplus. Because hospitals had to bear the full cost of overspending, the penalty was equal, in magnitude, to the deficit. If hospital administrators were concerned with the implications of the financial target for the financial status of their hospital, then AP would be the appropriate measure. But possibly hospital administrators regarded the financial target as an arbitrary constraint and wished to avoid a dollar of surplus just as much as a dollar of deficit. In this case SD would be the appropriate measure.

Five sets of factors are identified for their possible influence on SD and AP. First, the size of the hospital's budget is likely to influence SD and AP. This measure is included in the model by expressing SD and AP as a percentage of the hospital's finally approved budget, for reasons explained in due course.

Second, just as the hospital's award or penalty will change the hospital's financial status when measured in terms of its net assets, so the hospital's current financial status in turn may have an influence of its own on the hospital's attitude towards its short-term financial target defined in terms of the budget constraint. Hospitals may wish to ensure not only that all their current costs are covered, but also that they accumulate sufficient funds and income to finance capital expenditure. The latter could be used to make good wear-and-tear and obsolescence, or to add to the physical resources of the hospitals. Hospitals did not, of course, rely entirely on their own financial resources: the provincial government provided substantial grants. But hospitals, somehow or other, had to finance one-third of the cost of construction and related equipment and, temporarily, the whole of hospital-related equipment. Hospitals could draw on internal funds, and a strong financial position of their own would have facilitated external borrowing too. We therefore suggest that hospitals with a poor financial status were under a greater incentive to avoid deficits and generate net income, and would expect a negative correlation between the hospital's financial status and AP. Financial status is not predicted to influence SD except through its influence via AP, because the influence on SD depends upon the financial target being considered as an arbitrary constraint.

Financial status is measured in two ways: one stock, the other flow. Both are expressed as a fraction of the hospital's approved budget in 1972 in order to avoid some of the estimation problems that would otherwise come from testing the model. The stock measure is the hospital's assets and liabilities as at year-end 1971: that is, immediately prior to the period under study (1972). The original data are expressed in five components: two for assets (current, and assets held for capital purposes) and three for liabilities (current, capital and short term, and long term). Because assets may be, and sometimes are expressed as negative liabilities, and because there are no clear rules about the allocation of funds between current, short, and long term accounts, various combinations of the five components were tried in the statistical analysis. These combinations were: all five separate (AS1, AS2, LI1, LI2, and LI3), assets combined (AS) and liabilities combined (LI), and all five combined (AS-LI). The specification usually chosen was on the basis of goodness of fit as explained in the Statistical Appendix.

The flow measure of current financial status is total non-deductible

income (TNDINC) as defined in Table 7.4 above. The main source of this income came from differential charges for private and semi-private accommodation. Income from investments was a relatively small component and, as a result, the stock and flow measures of financial status give independent and complementary information on the ability of hospitals to meet their short- and long-term financial targets.

The third set of factors identified reflects the ability and willingness of those running the hospitals to adjust the approved budget and hence modify the financial target they face. In 1972, this adjustment was possible for in- and out-patient activity. However we would expect to observe this relationship only if a number of conditions were satisfied. First, that there be a discrepancy between adjustments to the approved budget and the expenditure incurred from doing so. The observation of a discrepancy is, however, no evidence that use was taken of it; to observe that use would require a measure of the scope to adjust the approved budget. Such a measure is available for in-patient activity, being the percentage of beds set aside for active treatment (PACT). It is not available for out-patient activity, although the magnitude of its extent (OPINC) is known.

If the above conditions were satisfied then one would expect PACT to be positively correlated with AP and SD. The correlation between PACT and AP follows from the behavioural assumption that hospitals adjust activity to avoid deficits as far as possible and even do so to obtain a surplus. When PACT is large the scope for hospitals to do so is increased proportionately. The predicted positive correlation between PACT and SD also relies on the same adjustment mechanism, but the motivation behind adjusting in-patient activity is different. Where hospitals regard the financial constraint as arbitrary, their attitude to that constraint can be more relaxed when it is an easy one to achieve. In such circumstances deficits may be expected to be more easy to avoid.

The measure of out-patient activity (OPINC) is, nevertheless, included in the models of AP and SD but it indicates, in the case of SD, the discrepancy between adjustments to the approved budget and the expenditure incurred from different levels of out-patient activity. A positive coefficient in the model of SD implies that adjustments to the approved budget were larger than the expenditure incurred, and the estimated coefficient indicates the magnitude of that difference. The significance of OPINC in the model of AP would derive from that found in the model of

SD.

The fourth set of factors identified relate to the uncertainty associated with planning expenditure when the finally approved budget is not known precisely until after the end of the financial year. This feature was mentioned in the introduction to this chapter. The four largest adjustments to the approved budget between 1971 and 1972 in descending order of magnitude were: global increases (for inflation), new programmes, out- and in-patient activity.

The two major sources of uncertainty were from changes in in- and out-patient activity because the adjustment to the approved budget for them was known only at the settlement after the end of that financial year. In the case of in-patient activity the formula was far from simple and few hospitals could have known the magnitude of the adjustment to the approved budget with any accuracy, even had they known by how much in-patient activity had changed in non-financial terms. These two sources of uncertainty are measured in terms of the change in the approved budget, CHIPINC and CHOPINC, for in- and out-patient activity respectively. The adjustments to the approved budgets at most hospitals in 1972 were in an upwards direction (Table 7.3) and, arguably, the larger the adjustment the larger the surplus, and therefore the award. We therefore predict that CHIPINC and CHOPINC are positively correlated with AP and SD.

Fifth and finally, administrators may be frustrated in their efforts to control expenditure and the approved budget for whatever reason. Three sources of frustration are identified: the catchment population served, the medical staff, and the type of care provided. The three are discussed in turn.

There is evidence of discrepancies in the geographic distribution of population and in-patient care in Ontario. Arguably hospitals have least control in meeting their financial target where in-patient resources per capita are lowest. Data on the geographic discrepancies in 1974 are available from the Ministry's own estimates of bed surpluses/deficits for the 155 hospital centres in Ontario that year. The bed surplus/deficit is defined as the difference between actual bed provision and that allowed if the Ministry's norms for that region (Northern and Southern Ontario) applied to the referral population. The bed surplus/deficit is expressed as a fraction of the number of beds allowed (POP). A hospital centre may have any number of hospitals attached to it. The population pressure to which

individual hospitals are subject is taken to be the value of POP estimated for the hospital centre of which it is a member. We would expect POP to be positively correlated with AP and SD.

The second constraint on the administrator's ability to effect a financial target is the hospital's medical staff. Reference has already been made (chapter 3) to the relationship of the medical staff to the hospital. Pauly and Redisch (1973) have drawn attention to possible conflicts of interest in, at least, the short run. Harris (1977 and 1979) has explored the relationship further, with the advantage of clinical experience as well as an economists' training behind him. Further reference will be made to his work. If there has been competition between hospitals and physicians in America, that competition has been still stronger in Ontario. In Ontario physicians have tended to generate expenditure for the hospital, rather than income. However, in 1972, the year under study, the final level of the approved budget depended on the level and mix of in- and out-patient care. Whether there was still a conflict that year depended, in part, on whether the income generated from additional activity more than compensated the expenditure incurred.

Medical staff data refer to those appointed by the board of trustees to have responsibility for all patients admitted. These staff are related to the total number of staffed beds available (MED). We expect that hospitals with a high value for MED would have greater difficulty meeting their financial target. Thus we expect MED to be negatively correlated with AP and SD.

The third and final feature that might influence the ability of administrators to achieve financial targets is the type of hospital. The sample studied in chapter 7 only excluded private hospitals and public psychiatric hospitals. It included teaching hospitals, hospitals for the chronically sick, and rehabilitation as well as general hospitals. For reasons explained in the Statistical Appendix, only public general hospitals are the subject of study in this section. The sample is further restricted to those reimbursed in 1972 on a global budget basis, as only these hospitals generate data on AP and SD. In all there are 156 such hospitals.

Hospitals vary considerably in size, for example on the basis of the number of staffed beds available. It seems more than possible that the magnitude of some of the predicted relationships with AP and SD might depend on hospital size. For example, at small hospitals the element of competitiveness between the medical staff might be smaller when faced with

a tight budget, and at such hospitals overspending would be less likely to occur. Size might have an influence of its own on AP and SD. The influence of size (SIZE) is captured by separating the sample into two equal parts, and takes a value according to the total number of staffed beds. Thus $SIZE = 1$ if the hospital had more than 105 beds; otherwise $SIZE = 0$. No predictions are made of the signs of the size interaction terms. We test the influence of SIZE on all parameters, but it is kept in the final model only if its omission within the fuller model results in a significant reduction in the model's explanatory power at the 5 per cent confidence level.

The model used to analyse the budget constraint (AP and SD) may be summarized as follows: the hospital's financial status, measured in terms of the stock of assets and liabilities ($AS1, \dots, LI3$) and the flow of non-deductible income (TNDINC); adjustments to the approved budget for in- and out-patient activity (PACT and OPINC); uncertainty (CHIPINC and CHOPINC); and various constraints (POP, MED, and SIZE). Their predicted correlations with the dependent variables are given in Table 8.1 with the results for the full model. A constant term is also included. All financial data (i.e., AP, SD, $AS1, \dots, LI3$, TNDINC, OPINC, CHIPINC, and CHOPINC) are expressed as a percentage of the hospital's approved budget in 1972. Otherwise the variables are untransformed. Complete data are missing for two hospitals, so the final sample size is 154 public general hospitals.

The model is tested by assuming a linear specification. There is no 'a priori' reason for choosing a linear as against a log-linear specification, for example. A linear specification does, however, have the advantage that the financial data on the left and right hand sides of each equation are comparable.

The model was first estimated using ordinary least squares (OLS). This choice was used to select the stock measure of financial status and to decide whether or not the SIZE variable should be included in the model. Studies of hospital costs indicate that OLS estimates of the variances are not constant with hospital size; see, for example, Feldstein (1967, 141). We explored the existence of this phenomenon for AP and SD, once the model's specification had been chosen. No evidence of heteroscedasticity was found for either AP or SD, and results shown in Table 8.1 are OLS estimates. Expressing all the financial variables as a fraction of hospital income in 1972 no doubt contributed to avoiding heteroscedasticity. This

TABLE 8.1
Analysis of budget constraint, 1972 (%) (OLS estimates)

	Expected Sign	AP	SD
AS - LI	-(?)	-0.34.10-2 (0.18.10-2)	-0.15.10-1 (0.10.10-1)
TNDINC	-(?)	0.98.10-1 (0.61.10-1)	0.86 (0.33)*
PACT	+	0.31.10-2 (0.42.10-2)	0.25.10-1 (0.23.10-1)
OPINC	NK	0.39.10-1 (0.12.10-1)**	0.22 (0.06)**
CHIPINC	+	0.10 (0.03)**	0.60 (0.16)**
CHOPINC	+	0.75.10-1 (0.38.10-1)	0.44 (0.21)*
POP	+	0.92.10-1 (1.53.10-1)	1.73 (0.83)*
MED	-	-0.97 (0.55)	-6.7 (3.0)*
Const.		-0.60	-2.5
R ²		0.250	0.302
D.F.		145	145

NOTES: *, ** denote statistically significant from zero at the 5 per cent and 1 per cent significance levels respectively. Standard error estimates are given in parentheses.

transformation is almost certainly also responsible for the absence of serious multicollinearity, evidence of which is shown in the Statistical Appendix through the use of principal component analysis. Finally, summary data on the means and standard deviations of all variables included in Table 8.1 are shown in Table A.2. All had sufficiently different values, as well as being uncorrelated with each other, to identify any causal relationship with AP and SD as may have existed.

The results of the full model for both measures of the budget constraint are shown in Table 8.1. They are largely self-explanatory. There is evidence that financial status mattered, but the results are contradic-

tory. One might have expected the stock and flow measures to be both positive, or both negative. Instead, the signs are opposite. No satisfactory explanation is offered.

There is no evidence to support or reject the hypothesis that the levels of in- or out-patient activity were changed to modify the budget constraint. The non-significance of PACT may be because adjustments to the approved budget for changes in in-patient activity corresponded, over the long run, with the expenditure incurred. As noted earlier, no behavioural significance can be attached to the statistical significance of the OPINC variable. This indicates the accounting fact that hospitals which had \$1,000 more revenue from out-patient activity had, on average, a surplus of \$220 compared with other hospitals.

There is evidence that retrospective adjustments to the hospital's budget for within- year changes in in- and out-patient activity had an influence on SD and therefore on AP. Every upward adjustment of \$1,000 resulted in a surplus, on average, of \$600 in the case of in-patient activity and \$440 for out-patient activity. The different orders of magnitude may be explicable in terms of the different costs involved for in- and out-patient activity. However, in a situation where upward adjustments were the rule, the more complex formula for in-patient activity may have created greater uncertainty as to the precise magnitude of the change to the approved budget at the settlement. As is noted in chapter 7, out-patient activity in 1972 was reimbursed on a fixed fee-for-service basis, with only three rates of reimbursement all set prospectively. But adjustment for in-patient activity depended upon the mix of diagnoses and length of stay, and the scales were set retrospectively on the basis of hospitals' costs already incurred.

Two of the three constraints on administrative action - the catchment population and medical staff - both have their predicted signs and, in the case of SD, the coefficients are statistically significant. Hospitals located at centres with 10 per cent fewer beds, relative to what they might be expected to have had on the basis of their catchment population, made more use of their approved budget by some 2 per cent.¹ There is, however, no evidence that hospital size had any statistically significant impact on AP or SD, or on the relationship between them and the set of explanatory variables.

Finally, we note that, using the same set of explanatory variables, the statistical fit (R^2) is larger by an order of magnitude for the model of

SD than for AP. It would appear then that hospitals tended to give equal weight to a dollar of surplus and deficit, rather than weigh them 1:10, as is implied by the model of AP.

In conclusion, the predicted impacts of the constraints, the catchment population, and medical staff suggest that administrators had a financial target as one of their goals. Their ability to keep to it, however, was considerably frustrated by the uncertainty of its level following retrospective adjustments for within-year changes in the levels of in- and out-patient activity. The hospitals' financial status is correlated with SD, but hardly in a predictable fashion. There is no evidence that hospitals with substantial non-deductible income used it to finance deficits. Rather the reverse was the case. Hospitals that had accumulated substantial non-deductible income were those most likely to be in surplus.

In-patient activity

In the previous section we concluded that administrators tried to enforce financial targets in 1972, although their ability to do so was modified by certain local and other circumstances. In this and the following sections we explore the implications of this constraint for in- and out-patient activity. In this section we concentrate upon in-patient activity.

The concern in this section is less with identifying the determinants of the level on in-patient activity so much as those of its change over time. Between 1971 and 1973 hospitals on a global budget had their approved budget adjusted for changes in the level of in-patient activity using a formula approach. Reference has been made to the complexity of the formula, and this is thought to account partly for the large surplus some hospitals obtained in 1972. Nevertheless, upward adjustments of some magnitude could have been anticipated if in-patient activity had changed in the desired direction. Hospitals may have made some such adjustment with a financial goal in mind.

It is in order to test the possibility of a behavioural response that we analyse factors influencing changes in bed use in two ways. The first does so in terms of the direct financial implications for the approved budget of a change in bed use during 1972. Effectively, then, we analyse the behaviour of CHIPINC. Changes over only one year are likely to be governed by a relatively large number of random factors and, whilst predicted impacts can be expected to be observed, they should be more

evident over a longer period. Hence we use a similar model to analyse the change in bed use, in non-financial terms, over the period 1971 to 1974. We begin with CHIPINC.

Change in bed use, 1972

We draw heavily on the analysis of the financial target for an understanding of the factors likely to influence the change in the approved budget between 1971 and 1972 due to changes in in-patient activity at active treatment hospitals. This is evident from our decision to analyse CHIPINC expressed as a percentage of the hospital's total income. It is also evident from our continued use of the two measures of financial status - stock and flow - namely, AS1,...LI3 and TNDINC. Whether CHIPINC is positively or negatively correlated with them depends upon whether increases in activity were thought would raise the approved budget by more than expenditure. The analysis of SD shows this was the case in 1972. If those running the hospitals had appreciated this fact, then those in financial difficulties would have been most likely to increase in-patient activity. In other words, we would expect net assets (AS-LI) and TNDINC to be negatively correlated with CHIPINC.

The dependent variable, CHIPINC, refers to adjustments affecting active treatment units only. Yet, several of the explanatory variables, as for example the financial ones, refer to all units in the hospital. We therefore reintroduce PACT, the percentage of beds at all units in any given hospital allocated to active treatment. The larger that percentage the greater the ability to vary CHIPINC. We would therefore expect the correlation between them to be positive.

Related to PACT for its influence on CHIPINC are two other variables. The first is case flow (i.e., cases per bed per year) at active treatment units (CFRA). The formula adjusting the approved budget only operated for changes in case flow; it made no adjustment to patient-days except in so far as they stemmed from changes in case flow. CFRA refers to the year 1971, i.e., the year preceding the year (1972) for which CHIPINC is analysed. We would expect the high levels of CFRA in 1971 to limit the growth of CHIPINC in 1972: i.e., that they would be negatively correlated.

Typically, however, some of the hospital differences in case flow are due to differences in length of stay, even when corrected for diagnosis,

etc. To take account of these differences we also introduce the fraction of staffed beds occupied in 1971 at units providing active treatment (OCRA) into the model. Thus, given OCRA, we would expect CFRA to be negatively correlated with CHIPINC. Similarly, given CFRA, we would expect OCRA to be positively correlated with CHIPINC. In the latter case a high value of OCRA indicates patient stays in 1971 were long,² and would offer greater scope for admissions to be increased in 1972 through the reduction in the length of stay.

The three constraints on the administrator's ability to meet the financial target, identified earlier, are also included in the analysis of CHIPINC. POP and MED, but not SIZE, are, however, introduced for rather different reasons. If hospital differences in POP and MED influenced changes in bed use, it is because full adjustment to these differences had not been achieved by 1972. Thus, while POP and MED may be expected to influence the level of bed use, their influence on changes in that level reflects a different causal basis: namely, that the pressure to increase the use of existing bed stock would be greater the larger POP and MED. In the case of POP that influence can be tested specifically for active treatment beds (POPA). The data on MED refer to all types of care.

The same sample is used to analyse CHIPINC as is used earlier to analyse AP and SD. SIZE is therefore defined in the same way. $SIZE = 1$ if the total number of beds is greater than 105; otherwise $SIZE = 0$.

The model used to analyse the change in the approved budget between 1971 and 1972 due to changes in bed use at active treatment units (CHIPINC) may be summarized as follows: the hospital's financial status ($AS1, \dots, LI3$ and $TNDINC$); the percentage of beds allocated to active treatment (PACT); bed use at active treatment units in 1971 (CFRA and OCRA); and various constraints (POPA, MED and SIZE). Their predicted correlations with CHIPINC are given in Table 8.2 together with the results of the full model. A constant term is also included. All financial data ($CHIPINC$, $AS1, \dots, LI3$ and $TNDINC$) are expressed as a percentage of the hospital's approved budget in 1972; otherwise the variables are untransformed. Complete data are missing for two hospitals, so the final sample size is 154 public general hospitals.

Exactly the same method of estimating CHIPINC is used as for AP and SD earlier in the chapter and will not be outlined again. There is no evidence of heteroscedasticity and so OLS estimates are presented in Table

TABLE 8.2

Analysis of change in approved budget due to change in in-patient activity, 1972 (%) (OLS estimates)

	Expected Sign	CHIPINC
		(0.05.10-1)*
TNDINC	-	0.19 (0.17)
PACT	+	-0.36.10-2 (1.25.10-2)
CFRA	-	-0.39.10-1 (0.24.10-1)
OCRA	+	-0.18.10-1 (0.11.10-1)
POPA	+	-0.13 (0.39)
MED	+	0.83 (1.51)
Const.		3.19
R ²		0.082
DF		146

NOTES: *, ** denote statistically significant from zero at 5 per cent and 1 per cent significance levels respectively.
Standard error estimates are in parentheses.

8.2. Nor is there evidence of serious multicollinearity. Multicollinearity is not the cause of the non-significance of CFRA, OCRA, POPA, and MED.

The results of the full model of the financial adjustment made in 1972 are shown in Table 8.2. As an explanation of differences in CHIPINC the model must be regarded as a failure. The full model is not significant at the 5 per cent level. Indeed the only factor correlated with CHIPINC is the hospital's net assets (AS-LI). The coefficient of this variable is consistent with expectations, based on the facts that retrospective adjustment for increases in in-patient activity invariably resulted in a surplus in 1972, and that knowledge may have been taken of this possibility to meet the financial target then. However, it is worth noting that hospitals with \$1,000 of net assets forfeited a surplus, on average, of only \$22.³ Net

assets would have benefited by \$2 if the hospital had been in surplus and by \$22 if it had been in deficit. This would seem poor compensation for a difference of \$1,000 of net assets.

It is also worth noting that differences in the upward adjustment to in-patient activity at active treatment units in 1972 seem to have been unresponsive to differences in base year bed use or to the pressures on the beds by the catchment populations and medical staff. These results are unaffected by hospital size.

Change in bed use, 1971 to 1974

The poor statistical fit of the model of changes in the approved budget is possibly because the adjustment to the formula is tested for its impact over only one year. If the period had been longer the fit might be better. To test this possibility we use data on bed use, measured in non-financial terms, for the years 1971 and 1974. These two years encompass virtually the whole of the short life of the formula. As is noted in chapter 7, the formula was first used in 1971, and was fully operational only that year and in 1972. In 1973, upward adjustments to the approved budget were only allowed if this helped hospitals avoid a deficit. In 1974, the formula was abandoned completely.

Bed use is measured in three ways: case flow (CFR, the number of cases per bed per year); length of stay (LOS, measured in days or weeks); and bed occupancy (OCR, the fraction of staffed beds occupied during the period, i.e. year, in question). The three are so defined (see Appendix A) as to be identically related in the manner shown in equation 8.1 below.

$$\text{OCR} = k. \text{ CFR} . \text{ LOS} \quad (8.1)$$

If, say, case flow increased by the fraction 'a' and length of stay fell by the fraction 'b', then occupancy would change by approximately the fraction 'a-b'.⁴ Bed use is analysed in terms of all three measures. When the same model is used for the three measures we should therefore expect the coefficients of each explanatory variable to be related in the manner just described.

Four (sets of) factors are identified for their possible influence on changes in bed use at active treatment and chronic care units. The first

is the familiar hospital financial status, measured in terms of its assets (and liabilities) and non-deductible income. In so far as the formula influenced hospital behaviour, then we predict that financial status would have no impact on bed use at chronic care units. On the other hand, financial status might be expected to have much the same impact at active treatment units as we predict above for CHIPINC. In other words, we might expect both measures of financial status to be negatively correlated with the percentage change in case flow (CHCFRA). The formula allows a further prediction of the possible influence of financial status on bed use at active treatment units. The formula is clear that the approved budget would not be reduced if patient stay were shortened. On the other hand, given the number of admissions, shortening stay would result in expenditure falling. Thus hospitals in a poor financial position might make more effort than others to reduce length of stay. Hence we would expect both measures of financial status to be positively correlated with the percentage change in length of stay (CHLOSA).

The above predictions are based on the particular reimbursement formula employed to adjust the approved budget and expenditure for changes in bed use at active treatment units. The predictions contrast markedly with what Harris (1979, 93-94) believes would more usually occur in situations of excess demand. He suggests that admissions would be controlled: presumably they would be reduced. More serious cases would be given priority, which he expects would result in average stay lengthening. Finally he suggests that physicians would tend to scramble for the scarce resources, be more prone to order procedures which in other circumstances would be regarded as unnecessary, and cause stay to lengthen still further.

The second set of factors also draws from the model of CHIPINC above, where we point out that base-year bed use may limit the ability to adjust the approved budget subsequently, especially as adjustments were usually in an upwards direction. Base-year bed use is measured in terms of case flow and bed occupancy in 1971 (CFR71 and OCR71), whose predicted impacts on the change in bed use between 1971 and 1974 are given in Table 8.3. Such predictions as can be made all depend on the relative inability either to reduce length of stay where it is already comparatively low, and/or to increase OCR beyond its upper limit, in principle, of 100 per cent. These predictions apply to active treatment and chronic care units.

The third factor introduced into the analysis is the percentage change in the number of staffed beds available (CHSB). The basis for its conclusion is much the same as for CFR71 and OCR71. We expect that as bed supply increases, so the pressure to make use of the beds available would be reduced, causing CFR to fall and LOS to increase. The outcome for OCR cannot be predicted. These predictions also apply to active treatment and chronic care units.

The fourth and final factor introduced into the model allows for possible constraints on administrative action to adjust bed use. This is identified here only in terms of splitting the samples into two equal parts according to the number of staffed beds available in the appropriate type of care. There were 192 hospitals which had active treatment units in 1971 and 1974; the corresponding number for chronic care is 100. The influence of size is tested in the same manner as for AP, SD, and CHIPINC. SIZE = 1 if the hospital had more than 201 beds in active treatment units, or 28 beds in chronic units, otherwise SIZE = 0.

The model used to analyse percentage changes in bed use may be summarized as follows: the hospitals' financial status measured in terms of its assets and liabilities (AS1,...,LI3) and non-deductible income (TNDINC); base-year bed use (CFR71 and OCR71); the percentage change in staffed beds available (CHSB); and some critical number of staffed beds available (SIZE). The financial status measures are expressed as a percentage of total hospital income; otherwise the data are not further transformed. Their predicted correlations with changes in bed use are given in Table 8.3. Except for the financial data, all variables are measured in terms specific to the type of care provided, i.e., active treatment or chronic care. A constant term is also included in the model. Complete data are missing for four hospitals with active treatment units and two hospitals with chronic care units, leaving final sample sizes of 188 and 98 hospitals respectively.

The results of the full model are given in Table 8.4 for active treatment units and Table 8.5 for chronic care units. OLS estimates are given as there is little evidence of heteroscedasticity. Nor is there evidence that multicollinearity is a serious problem (see the Statistical Appendix). The results confirm several of our predictions. Indeed all the statistically significant estimates have their expected signs. The results may be summarized as follows.

Bed use at active treatment units, as compared with that at chronic

TABLE 8.3
The predicted relationships with changes in bed use

Explanatory variables	CHCFR	CHLOS	CHOCR
AS - LI (for active treatment)	(-)?	(+)	NK
AS - LI (for chronic care)	NK	NK	NK
TNDINC	(-)?	(+)	NK
CFR71	(-)	(+)	NK
OCR71	NK	(-)	(-)
CHSB	(-)	(+)	NK

TABLE 8.4
Analysis of change in bed use at units for active treatment, 1971-1974 (%)
(OLS estimates)

Expalantory variables	CHCFRA	CHLOSA	CHOCRA
AS-LI	-0.80.10-1 (0.28.10-1)**	0.27.10-1 (0.20.10-1)	-0.52.10-1 (0.20.10-1)*
TNDINC	-1.56 (1.24)	2.16 (0.90)*	0.34 (0.88)
CFR71A	-0.68 (0.15)**	0.34 (0.11)**	-0.21 (0.11)
OCR71A	-0.11 (0.08)	-0.35 (0.06)**	-0.41 (0.06)**
CHSBA	-0.33 (0.06)**	0.86.10-1 (0.47.10-1)	-0.24 (0.05)**
SIZE	5.23 (2.00)**	0.71.10-2 (145.86.10-2)	5.17 (1.43)**
Const.	38.7	5.3	34.8
R ²	0.285	0.194	0.384
D.F.	181	181	181

NOTES: *, ** denote statistically significant from zero at the 5 per cent and 1 per cent significance levels respectively.
Standard error estimates are given in parentheses.

TABLE 8.5

Analysis of change in bed use at units for chronic care, 1971-1974 (%)
(OLS estimates)

	CHCFR	CCHLOSC	CHOCRC
AS-LI	-0.31 (0.41)	-0.12 (0.19)	-0.32 (0.32)
TNDINC	-0.90 (4.19)	1.66 (1.93)	2.68 (3.35)
CFR71C	-15.2 (5.8)*	9.7 (2.7)**	-0.17 (4.65)
OCR71C	-1.53 (0.40)**	-0.69 (0.19)**	-2.09 (0.32)**
CHSBC	-0.15 (0.17)**	0.83.10-1 (0.76.10-1)	-0.18 (0.13)
Const.	205.3	23.8	188.7
R ²	0.245	0.198	0.344
D.F.	92	92	92

NOTES: *, ** denotes statistically significant from zero at the 5 per cent and 1 per cent significance levels, respectively.
Standard error estimates are given in parentheses.

care units, seems to have responded to the financial target in the predicted way. Hospitals in a strong financial position did less between 1971 and 1974 than others to increase their approved budget (via increasing case flow), and were more permissive in allowing expenditure to rise (via lengthening stay). This result directly contradicts Harris's observation, noted above. Harris suggests that hospitals behaving this way would have been in a weak, not in a strong financial position.

Nevertheless, the hospitals' behaviour was rational with respect to securing their financial viability. It is not possible to measure the response of hospitals in financial terms, but the magnitude is likely to have been larger by an order of magnitude than indicated above for the single year, 1972. This conclusion is based on the large size of the estimated coefficients of AS-LI and TNDINC relative to the change in case flow and length of stay experienced (Table 8.4), and on the range of values that AS-LI and TNDINC take (Table A.2). Nevertheless, the poor opportunity to obtain large awards did mean that hospitals had little

chance to correct a weak financial status. Rather they took the opportunity to prevent its further deterioration.

We also find evidence, as predicted, that base-year bed use influenced subsequent increases in bed use for both types of care. This result was not found in the analysis of CHIPINC, which covered only one year. Hospitals whose base-year bed use was high experienced smaller subsequent increases in bed use, reflected in terms of the increase in admissions and the reduction in patient stay (implied by a negative coefficient for OCR71).

Active treatment and chronic care units had very different experiences in respect of changes in their bed provision. At active treatment units, bed provision changed for about three-quarters of the hospitals and usually involved cuts. These cuts usually had an impact on the use of those remaining. Thus, on average, a 10 per cent cut increased case flow by 3.3 per cent, resulting in a reduction in admissions of only 6.7 per cent. At chronic care units, on the other hand, bed provision changed for about one-half of the hospitals and usually involved an increase. These increases, however, had no significant impact on case flow, so that a 10 per cent increase in bed provision increased admissions by 10 per cent as well.

Size had an influence on the change in bed use, but only at active treatment units, and not so as to affect the relationship between any of the identified explanatory variables and the change in bed use. Bed use at active treatment units with more than 201 beds experienced a larger increase in bed use by approximately 5 per cent, virtually wholly attributable to a greater increase in case flow.

Out-patient activity

In the period up to and including 1972 out-patient activity was funded on a fee-for-service basis insofar as this defined the final approved budget. Changes in the level of activity were funded in the same way. Thereafter out-patient activity and changes in its level were funded, if at all, on the basis of costs expected to be incurred (see chapter 7). Thus up to 1972 out-patient activity was the chief alternative to in-patient activity as a means for hospitals to achieve their financial target. The analysis of the hospitals' surplus/deficit (SD) positions in 1972 shows that payment at the margin for out-patient activity was well in excess of the costs incurred

(Table 8.1). The excess was present both for the level of activity the hospital might have expected on the basis of previous years' experiences (OPINC), and for the retrospective adjustment for its change during 1972 (CHOPINC). Their respective magnitudes were, on average, \$220 and \$440 for every \$1,000 adjustment to the hospital's income.

There can be little doubt that those running the hospitals were aware at the time of discrepancies of this kind, although their order of magnitude may not have been known. There is some evidence from the previous section that hospitals adjusted in-patient activity to meet financial targets. In this section we explore the possibility that out-patient activity was influenced in much the same way. Out-patient activity is analysed in financial terms, being out-patient income in 1972 as a percentage of total hospital income in that year (OPINC). This variable previously appeared in Table 8.1.

Four sets of factors are identified for their influence in out-patient income. The first includes the familiar data sets on financial status, net assets (AS-LI), and total non-deductible income (TNDINC). We would expect both to be negatively correlated with OPINC. The reasons behind this prediction are that hospitals have financial targets (assumed) and that increasing out-patient activity increased the hospital's approved budget by more than its expenditure (demonstrated).

Second, and related to the financial data in the reasoning for its inclusion, is a measure of the hospital's ability to meet its financial target via in-patient activity. This is measured in terms of PACT, referred to previously, being the percentage of staffed beds allocated to in-patient activity.

The two remaining sets of factors reflect the ability of hospitals to provide care for patients. The first of these refers to the availability of in-patient care. Our assumption is that out-patient care for some patients is an inferior alternative to in-patient care. When bed use is high patients are referred, instead, for out-patient care. Bed use is measured in terms of case flow and bed occupancy, as previously defined, and refers to all types of care in 1971. We therefore measure the response to events recorded during the previous year. A delay of one year is not an unreasonable assumption if new clinics must be set up. Where no extra clinics are required the response would be more immediate. It is possible that this response would also be captured if, as the analysis of CHIPINC shows is quite possible, next to no adjustment occurs within a twelve-

month period to existing differences in bed use.

Given bed occupancy (OCR), then high case flow (CFR) implies that patient stays are already short (see equation 8.1 above) which, in turn, is an indication that pressure on beds is great and that out-patient activity must be expanded if bed supply is not. By the same line of reasoning we would expect out-patient activity to be negatively correlated with bed occupancy.

The fourth and final set of factors have also previously made their appearance. They are POP, MED, and SIZE. The inclusion of SIZE is again for the same 'ad hoc' basis. SIZE = 1 if hospitals have more than 105 beds; otherwise SIZE = 0. The inclusion of POP and MED have rather different bases, again. Both may be expected to influence out-patient activity through the demands they make on bed use and, to that extent, their influences might reasonably be expected to be captured by CFR and OCR which are already in the model of OPINC.

In the case of POP there is reason to believe, that it may have a further influence of its own on out-patient activity. POP is a measure of patient pressure on beds based partly on the provincial government's norms for bed provision. These norms were different for Northern and Southern Ontario in respect of active treatment, being 4.5 and 4.0 beds per 1,000 population respectively. The higher norm reflects the lower population density of Northern Ontario and the greater difficulty of access to hospitals. If the measure POP only captured this difference in population, then it would be a measure that is negatively related to population density.⁵ It seems plausible that the choice in the balance of care is influenced by population density. In a continuum of choice between the sites of treatment one might expect that in sparsely populated areas there would be greater emphasis on in-patient treatment (when hospital care was required) and at the physician's office (when it was not): both would be at the expense of out-patient activity. Hence, when population density is low we predict that, apart from its influence on bed use, the measure POP would be positively correlated with out-patient activity as a proportion of total hospital activity (i.e., OPINC).

The influence of MED on out-patient activity, independent of that via bed use, has no explicit 'a priori' basis. It is included with POP, although it is recognized that both may be correlated with bed use (CFR and OCR). Recognition is given to this possibility in the statistical analysis. It seems plausible that medical staff would be more willing to set

up out-patient clinics and use those already available at hospitals where they have limited access to beds. In such circumstances MED would be positively correlated with OPINC.

The model is tested on the same sample of 156 public general hospitals that are used to analyse the budget constraint (AP and SD) and adjustments to changes in the approved budget in 1972 via in-patient activity (CHIPINC), for the same reasons. Only one hospital had no out-patient facilities, but it is included in the sample to allow comparisons to be made with the analyses of AP, SD, and CHIPINC. We do not have complete data for two others. They were excluded from the analyses of AP, SD, and CHIPINC and are excluded from the analysis of out-patient activity as well. The final sample is 154 public general hospitals.

The model of out-patient activity is summarized as follows: the hospital's financial status (AS1,...,LI3 and TNDINC); the constraint on the ability to adjust the approved budget via changes in in-patient activity (PACT); the extent of in-patient activity as an alternative to out-patient provision (POP and MED); and SIZE. The financial data are expressed as a fraction of hospital income in 1972. The data on all these variables refer to all types of care provided. A constant term is included. Their predicted relationships to out-patient activity are summarized in Table 8.6.

We explore the behaviour of out-patient activity in 1972 in two different ways. In one case we assume that out-patient activity in 1972 adjusted fully in that year to the identified exogenous changes. The analysis of adjustments of bed use to exogenous changes suggests this assumption is unrealistic. Nevertheless, results adopting it are reported. In the second case we allow partial adjustment by including in the model an additional explanatory variable, OPINC lagged one year (OPINC71). Data on out-patient income in 1971 as a percentage of the hospital's approved budget in 1971 are available to allow this to be done. The coefficient of OPINC71 is expected to be positive and lie between zero and unity. The closer to unity, the smaller is the adjustment to exogenous changes within the year (Wallis, 1969, 771-782).

The same estimation procedures are used to analyse out-patient activity as were used earlier in the chapter. On this occasion there is some evidence of heteroscedasticity for one of the two models, and the weighted least squares (WLS) estimates are given. There is no evidence of serious multicollinearity although it has an 'a priori' basis. The statistical significance of the various results is not affected by such as may exist.

TABLE 8.6
Analysis of out-patient income, 1972 (%)

Explanatory variables	Predicted sign	OPINC (1) (OLS)	OPINC (2) (WLS)
OPINC71	(+) for (2)	-	0.92 (0.05)**
AS-LI	-	0.69.10-2 (1.41.10-2)	0.34.10-2 (0.74.10-2)
TNDINC	-	0.77.10-1 (4.71.10-1)	0.43 (0.23)
PACT	-	-0.61.10-1 (0.45.10-1)	-0.16.10-1 (0.23.10-1)
CFR71	+	0.22 (0.07)**	0.48.10-2 (4.04.10-2)
OCR71	-	-0.40.10-1 (0.37.10-1)	-0.70.10-1 (0.21.10-1)**
POP	+	-1.24 (1.25)	-0.13 (0.69)
MED	+	-6.89 (4.25)	-1.72 (2.22)
Const.		15.00	8.00
R ²		0.100	0.847
D.F.		146	145

NOTES: *, ** denote statistically significant from zero at the 5 per cent and 1 per cent significance levels respectively. Standard error estimates are given in parentheses.

The results are presented in Table 8.6 and may be summarized as follows. There is very little evidence to support the predictions made. Model 2, OPINC with a lagged dependent variable, gives an estimate for OPINC71 not significantly different from unity. This implies no adjustment from year-to-year to the set of exogenous influences identified. The poor fit for model 1 ($R^2 = 0.100$) is therefore readily understood because it assumes full adjustment within the year. The two factors significantly correlated with OPINC both refer to bed use and have their predicted

signs. It would seem that, for whatever reason, pressure on in-patient care tended to result in out-patient care being provided as an alternative. In conclusion, out-patient activity as a proportion of all hospital activity changed little from year to year. The level of provision was responsive to shortages of bed provision. It was not responsive, however, to the financial advantages up to 1972 implied by the generous reimbursement formula used for out-patient care.

Summary and some further conclusions

The review of prospective incentive schemes in America showed that hospitals there have responded to financial targets and that as a result costs can be contained. Whether they actually were responsive depended very much on the design of the schemes. Ontario's scheme during the early 1970s had all the best features of the American schemes reviewed. However, hospitals in Ontario had greater public sector support for their capital expenditure than did their American counterparts, and their need to generate net income and raise other sources of external finance was correspondingly weaker. Thus the incentive for hospitals in Ontario to respond to financial targets may have been weaker than the American experience might suggest.

In this chapter we find evidence that hospitals in Ontario did indeed keep to their financial targets, although the evidence for this conclusion is more indirect than that found in the evaluations of the American schemes in Part II. It is based on the close proximity of actual expenditure to the final approved budget in 1972 (chapter 7) and on the results of the analysis of the budget constraint. The latter showed that the failure to match expenditure to the final approved budget could be attributed to retrospective adjustment to the approved budget for changes over the year to in- and out-patient activity, and to pressures from the hospital's medical staff and catchment population to spend such funds as had been approved. Interestingly, the desire by hospitals to keep recurrent expenditure within their approved budgets was not influenced by their current financial status as measured in terms of net assets. There is a statistically significant relationship between the budget constraint, as measured by SD, and non-deductible income, but it is not clear why they are positively correlated.

The review of American schemes also showed that sometimes hospitals

adjusted the level of (in-patient) activity to help them meet their short-term financial target to cover costs. The analysis in this chapter allows similar behavioural relationships to be identified. They include in- and out-patient activity for their effects on the hospital's short and long term financial targets. We first draw conclusions for the short-term financial goal to cover costs.

The most direct information on the short-term financial goal comes from the analysis of the budget constraint, whose results are shown in Table 8.1. Four variables capture the possible influence of in- and out-patient activity on the hospital's ability to cover its costs. Two refer to the retrospective adjustment for changes in in- and out-patient activity during 1972 (CHIPINC and CHOPINC). Both are statistically significant, but their behavioural significance is explained in terms of the uncertainty hospitals faced in planning expenditure when their final approved budget was not known until after the end of the financial year. Their influence on the budget constraint was not one planned by hospitals. A third variable measures the scope hospitals had to alter in-patient activity (PACT). Its non-significance can arguably be attributed to the failure of hospitals to alter in-patient activity to meet the short-term financial goal, although other explanations are also possible. The fourth variable measures the extent of out-patient activity (OPINC). This is statistically significant in the analysis of the budget constraint, but reflects the accounting fact that reimbursement was different from the costs incurred. More important for an understanding of hospital behaviour is the analysis of OPINC itself. The results suggest that in 1972 out-patient activity was geared to making good the shortages of in-patient facilities, not to meeting financial targets whether short or long term.

We turn finally to the adjustments made to in- and out-patient activity to meet the hospital's long-term financial target. Inferences of behavioural relationships are drawn from the influence of the hospital's financial status on in- and out-patient activity. Financial status is measured in terms of current net assets and non-deductible income. The main source of non-deductible income comes from differential charges for private and semi-private accommodation, not from income from investments. These two dimensions of financial status therefore had independent influences of their own on the hospital's ability to finance capital expenditure. Net assets are the main source of internal funds. Non-deductible income could provide security against which borrowing might be made. Whether non-deductible

income was used this way is not clear. It could, for example, have been used to finance expenditure not covered by the provincial government. Evidence that hospitals used it this way is mixed. The analysis of changes in bed use between 1971 and 1974 suggest it was used this way. The analysis of the budget constraint in 1972 suggests quite the opposite.

As mentioned above, there is no evidence whatsoever that hospitals adjusted out-patient activity to improve their financial status in 1972, even though the sums involved were not trivial and reimbursement for out-patient activity was large relative to the costs incurred. There is some evidence, however, of adjustments to in-patient activity to correct a weak financial status. However, the impact was small in relation to the size of the problem. Thus for every \$1,000 of debt at the beginning of the financial year 1972, hospitals obtained a surplus or avoided a deficit of \$22 that financial year. This was worth only \$2 or \$22 to the hospital's net asset position, depending on whether or not it had covered its costs during the financial year.

To put the limited scope of the incentive award scheme into still greater perspective we show what difference it could have made to the hospital's net asset position during 1972. At the beginning of that year only 13 per cent of the 156 general hospitals had net assets within ± 5 per cent of their hospital income during 1972, and nearly one-third had net assets in excess of ± 20 per cent of hospital income. Compared with these magnitudes their subsequent change attributable to prospective reimbursement in 1972 was trivial. Of the sample of 205 hospitals on a global budget only 7 per cent had an award or penalty valued at 1 per cent or more of their income that year (Table 7.6).

The analysis of the hospital's adjustment of in-patient activity over the longer period, from 1971 to 1974, suggests a larger response than occurred during 1972 alone, and it was a response to both the hospital's net asset position and its non-deductible income. The financial consequences cannot be estimated, but they were far from trivial insofar as action was taken to prevent a poor financial situation deteriorating further. This, however, was probably the limit to the action hospitals took. Efforts to correct a poor financial position would have been frustrated as hospitals invariably collected only 10 per cent of their underspending. In addition, hospitals had a limited incentive to accumulate large financial assets. First, they had to find only up to one-third of the cost of construction and related equipment and temporarily finance the whole of

hospital-related equipment. And second, hospitals had to obtain prior approval from the Commission/Ministry for capital projects if their revenue consequences were to be financed from the province's health insurance plan.

All in all we believe it is reasonable to conclude that in the early 1970s hospitals regarded prospective reimbursement more as an instrument used by the government to set arbitrary financial constraints than as a system used by themselves to improve their financial status.

NOTES

- 1 $2\% = p/173 \div 95.979$. 0.173 is 10% of the coefficient of POP in the model of SD (Table 8.1). $95.979 = 100\% - 4.021\%$, where 4.021% is the mean value of SD (Table A.2).
- 2 See equation 8.1 below for an explanation.
- 3 This result follows from using data in Tables 8.1 and 8.2. Table 8.2 shows that \$1,000 in (AS-LI) results in CHIPINC falling by \$11. Using Table 8.1, the \$11 fall in CHIPINC results in SD falling by \$7; and the \$1,000 change in (AS-LI) results in SD falling by a further \$15, making \$22 in all.
- 4 If $OCC = k \cdot CFR \cdot LOS$ and
 $OCC' = k \cdot CFR \cdot (1+a) \cdot LOS(1-b)$
 $= k \cdot CFR \cdot LOS \cdot (1+a-b-ab)$
 $= OCC \cdot (1+a-b-ab)$
then $\frac{OCC' - OCC}{OCC} = a-b-ab$
 $= a-b$, if ab is small
- 5 Let B be the number of beds available, and P the catchment population in thousands. The respective ratios of bed surplus/deficit to norm allowed (POP) are as follows:

$$\frac{B}{4P} - 1 \text{ for Southern Ontario, and } \frac{B}{4.5P} - 1 \text{ for Northern Ontario.}$$

$$\frac{B}{4P} - 1 > \frac{B}{4.5P} - 1.$$

The focus of this study has been hospital cost containment. The reason for the importance of this topic is that hospital expenditure represents a large and growing burden in both America and Canada. So serious is it, in fact, that a variety of mechanisms have been introduced by governments to modify the tendency for it to increase further.

The mechanisms to contain costs operate either on the demand for and/or supply of hospital services or the alternatives to this type of care. In particular, America has experimented with five types of mechanisms: patient cost sharing, health maintenance organisations, certification of need, utilisation review, and prospective reimbursement. In Canada the health services are so financed that only the last three have any possible place as legislation currently stands.

The first four mechanisms were reviewed for their impact on hospital (and health service) costs. In practice, patient cost sharing is only likely to substantially alter the public sector's share of the burden of financing care. It is not likely to alter overall expenditure. Health maintenance organisations do reduce hospitalisation by substantial amounts but, for reasons still unknown, this cost-effective type of organising health service has only been widely adopted in a handful of states in America. Possibly the method of physician reimbursement, being on a salaried or sessional basis, has proved a stumbling block. Certification of need and utilisation review do not seem to have had a consistently significant impact on reducing costs. However, their failure in this respect may reflect their poor design rather than intrinsic deficiencies.

This study, however, focuses on the fifth mechanism, prospective reimbursement (PR). PR has been adopted both in America and Canada. In America it was temporarily adopted on a universal basis as part of the federal government's Economic Stabilization Program from 1971 to 1974.

Otherwise in America PR has been adopted on an experimental basis with public (federal and some state government) support. In Canada PR has had a long history in Ontario, and it is probably reasonable to assume it has universal application in that country.

The rationale of PR is that hospitals have a financial target. In the short term they must cover their recurrent expenditure: hence the existence of the budget constraint. In the long term they must make good the depreciation due to wear and tear and obsolescence; they may even wish to add to their stock of physical assets. In the long term, therefore, hospitals require capital finance. Sources of finance can be internal from the hospitals' own funds, or external from philanthropy, government grants and borrowing. In America and Canada hospitals generally have not been able to rely entirely on government grants, directly or otherwise via the reimbursement of depreciation and interest charges. Moreover, philanthropy no longer plays a major role. If hospitals are to obtain capital finance they must generate internal funds, and doing so will make external borrowing easier.

There seems to be ample evidence that hospitals do have short term financial targets whose aim is that costs be covered. The question is whether PR can be used to reduce costs or their rate of increase. Studies of American experience give mixed results. Our evaluation of these studies and of that experience suggests that the success of PR depends in part on its design. Mandatory schemes which had within-year financial consequences that were not offset over the longer term seem to have contained costs. Others were less successful. Moreover, although the targets were set in terms of unit costs, often the intended effect to contain expenditure was also achieved, even though this outcome could not have been predicted.

More, however, is required of PR than simply its suitable design if costs are to be constrained. Mandatory schemes are not sufficient of themselves as the experiences of certification of need and utilization review through PSROs show. The additional element required is the will as well as the ability to set tough targets, and to do this those who set targets must accept that some expenditure is not justified even though there is no doubt of its medical benefit.

This additional element is most likely to be evident when the whole burden of finance is channelled through one agent and that agent is responsible for funding other activities. Herein lies the strength of the

Canadian system as it now stands. Since 1977 the provincial governments have been responsible for virtually the whole cost of marginal changes. The great weakness of the American system is the fragmentation of finance between federal and state governments, Blue Cross, Blue Shield, commercial insurance, and patients. When they all respond as one, hospital (and other) costs are likely to be contained. The choice of method to contain costs may not prove too important, because the political will is there to make the chosen method effective.

Ontario's PR scheme during the early 1970s had all the best features of the American schemes, and there is strong evidence that hospitals accepted the budgets set for them in much the same way as their American counterparts. One particular deficiency of the Ontario scheme was the uncertainty created for those planning expenditure due to the late stage at which retrospective adjustment was made to the approved budget for changes in the level of activity. Hospitals with more pressure on their in-patient resources, whether from their medical staff or catchment population, were more likely to be in deficit and to have smaller surpluses when they were not; but the magnitude of the impact was hardly sufficient to cause serious concern.

Finally, we also explore what adjustments were made to in- and out-patient activity to meet their short- and long-term financial targets. Some were made, though they seem to have been restricted to in- and not out-patient activity. The effect on the hospital's financial status was small to trivial. It was only really significant when directed to preventing a poor financial situation from deteriorating further. It would seem that hospitals accepted responsibility for ensuring that recurrent expenditure was less than their approved budget; it was largely left to others to finance such capital expenditure as hospitals expected to make over the longer term. A different system, which would make the hospital more dependent on internal finance and which gave larger awards, might result in hospitals modifying their behaviour more actively than they appeared to have done in the early 1970s.

Chapter 8 is a study of public general hospitals in Ontario, and draws on information from 223 that were in operation in 1972. Eighteen of these hospitals were on line budgets and, therefore, were automatically excluded from the prospective (incentive) reimbursement scheme. They are omitted in the analysis of the budget constraint (AP and SD) and out-patient activity (OPINC). The analysis of changes in bed use is restricted to hospitals which had provision for active treatment and/or chronic care in both 1971 and 1974. The numbers of such hospitals were 192 and 100, respectively. The stages of the analysis to obtain the final results are now described.

1. Recognition was given to the very mixed nature of groups of hospitals. Included were teaching hospitals, large and small general hospitals, and a residual group, i.e., 'other' including Red Cross outposts and hospitals directed to general and special rehabilitation. The teaching hospitals and residual groups proved to be very distinctive in several ways. For example, the residual group had very few beds allocated to active treatment. In addition, they often had no facilities for out-patient care. In order to reduce the problem of multicollinearity that would otherwise result, it was therefore decided to restrict the sample of hospitals analysed to general hospitals.

2. Financial status is measured in two ways - stock and flow. The stock measure has the five components indicated in chapter 8, two for assets and three for liabilities. There is no 'a priori' basis to guide their combination. We therefore selected that combination which had the best fit, in the sense that further disaggregation did not lead to a significant reduction in the explanatory power of the model at the 5 per cent level,

using OLS estimates. The test we used was analysis of variance. In general, 'AS-LI' gave as good a fit as the two other alternatives, and we decided to use this combination in all models.

3. A source of multicollinearity, heteroscedasticity and spurious correlations is that the large hospitals tended to have large assets and/ or larger liabilities, large non-deductible income, large surpluses or large deficits, and so on. All the financial variables - dependent and explanatory - were therefore scaled down and expressed in terms of the hospital's total income in 1972. This procedure would have reduced the likelihood of multicollinearity, heteroscedasticity and spurious correlations, but, as the following points 5 and 6 show, the first two are not entirely eliminated.

4. The hospitals studied varied enormously in their size. It seemed more than possible that the results for given models of large and of small hospitals would not be the same. For example, insofar as financial status had influenced the hospital's policy with respect to its budget constraint, then a dollar of liabilities might have been a more serious matter for a small hospital. This hypothesised influence of size on the relationship has no firm 'a priori' basis: rather, we tested for evidence of a statistical association. This test was done by adding a size interaction term (SIZE) to each explanatory variable and the constant term. The differentiation by size was retained in the final form of the full model where the SIZE term was significant at the 5 per cent level using OLS estimates.

SIZE was measured in terms of a binary value, taking values of unity if the hospital had more than a given number of beds, and zero otherwise. The critical number of beds was selected so that the sample was split into two equal parts. The critical limit for the analyses of AP, SD, CHIPINC and out-patient income was that SIZE = 1 if total staff beds exceeded 105. The corresponding data for the analysis of changes in bed use from 1971 to 1974 are 201 and 28 beds for active treatment and chronic care. In the latter two cases the bed limits refer to the type of care analysed.

5. Heteroscedasticity was tested for in every model. After the full final model was selected, the residuals were examined for their variation with hospital size, as measured by the number of staffed beds. Judgement was used and, on this basis, heteroscedasticity was judged to be absent in all

models except for the one relating to out-patient activity. In this case the sample was split into four equal parts on the basis of hospital size. The variance (02) for each group was estimated. The whole sample was then re-estimated, with each observation weighted by its group 0-1. These are the estimates that are reported.

6. Multicollinearity in each case was tested by the use of principal component analysis on the full final model. The results for the eleven models are given in Table A.1. They are identical in those equations where the sample of hospitals and set of explanatory variables are the same. The results show the explanatory power of the first four principal components. Also given are the values for the factors if the entire set of explanatory variables were orthogonal, that is, entirely uncorrelated.

One would expect these values to be rather less than for their corresponding principal components. There is little evidence, however, that the orthogonal value is very much less than might reasonably be expected, except possibly for the models of out-patient activity. We have 'a priori' reason to believe that POP and MED may be correlated with CFR71 and OCR71. We therefore tested the sensitivity of the results by first excluding POP and MED from the model, and then CFR71 and OCR71, using OLS. The statistical significance of the remaining variables was unaffected and thus we conclude that multicollinearity was not a serious problem in practice.

7. Finally, data are given in Table A.2 defining all the variables used in the analysis, their mean values, and their standard deviations. As a general rule there is sufficient variance in them all to allow correlations to be observed should causal relationships have existed.

TABLE A.1
 Variation of explanatory variables explained by principal component
 analysis (%)

Model	Number of principal components: Full			
	1	2	3	4
AP	21.3	39.6	54.7	66.3
SD	(12.5)	(25.0)	(37.5)	(50.0)
CHIPINC	26.0	44.7	61.7	77.6
	(14.3)	(28.6)	(42.9)	(57.1)
CHCFRA				
CHLOSA	24.6	43.48	61.9	77.0
CHOCRA	(16.7)	(33.3)	(50.0)	(66.7)
CHCFRC				
CHLOSC	28.9	50.0	65.8	80.8
CHOCRC	(20.0)	(40.0)	(60.0)	(80.0)
OPINC (Model 1)	28.9	50.0	65.8	80.8
	(14.3)	(28.6)	(42.9)	(57.1)
OPINC (Model 2)	25.8	45.1	59.8	73.4
	(12.5)	(25.0)	(37.5)	(50.0)

NOTE: The data in parentheses give values for the principal components if the set of explanatory variables had been orthogonal, i.e., uncorrelated.

TABLE A.2
Definitions, means (μ) and standard deviations (σ)

Variables	Definition	μ	σ
<u>Dependent</u>			
AP	Ratio of award/penalty in 1972 to income in 1972 (%)	0.324	0.604
SD	Ratio of surplus/deficit in 1972 to income in 1972 (%)	4.021	3.414
CHIPINC	Ratio of adjustment to approved budget for change in in-patient activity, 1971 to 1972, to income in 1972 (%)	0.454	1.472
CHCFRA	Change in caseflow, 1971-74 as (%) 1971	7.962	14.251
CHOCRA	Change in occupancy rate, 1971-74 as (%) 1971	-1.874	10.926
CHLOSA	Change in average length of stay, 1971-74 as (%) 1971	-8.259	9.793
CHCFRC	Change in caseflow, 1971-74 as (%) 1971	35.355	117.062
CHOCRC	Change in occupancy rate, 1971-74 as (%) 1971	21.493	100.506
CHLOSC	Change in average length of stay, 1971-74 as (%) 1971	1.817	52.307
OPINC	Ratio of out-patient revenue in 1972 to income in 1972 (%)	11.855	4.252

Explanatory

Table 8.1

AS-LI	Ratio of net assets end-year 1971 to income in 1972 (%)	2.349	25.999
TNDINC	Ratio of total non-deductible income in 1972 to income in 1972 (%)	1.727	0.769
PACT	Ratio of staffed beds allocated to units providing active treatment (%)	91.351	10.834

OPINC and CHIPINC: see above for dependent variables.

CHOPINC	Ratio of adjustment to approved budget for change in out-patient activity, 1971-72, to income in 1972 (%)	1.567	1.322
POP	Ratio of defined bed surplus/deficit to bed norm for hospital centre with which hospital associated	0.211	0.304
MED	Number of medical staff on hospital staff and with admitting privileges, per staffed bed	0.170	0.093

Table 8.2

AS-LI, TNDINC, PACT, and MED: see above.

CFR71A	Cases per bed per year in 1971	33.658	5.837
OCR71A	Occupancy rate (%)	80.223	11.650
POPA	See above	0.375	0.345

Table 8.4

AS-LI	See above	-2.363	32.518
TNDINC	See above	1.713	0.776
CFR71A	See above	32.834	6.240
OCR71A	See above	80.230	11.482
CHSBA	Change in staffed beds, 1971-74 as (%) 1971	-2.697	14.125

Table 8.5

AS-LI	See above	3.759	35.672
TNDINC	See above	1.961	3.423
CRF71C	See above	3.001	1.929
OCR71C	See above	79.416	27.957
CHSBC	See above	18.488	65.231

Table 8.6

AS-LI, TNDINC, PACT, POP and MED: see above

CFR71 and OCR7: see above

Subscripts A, C refer to experience at units providing active treatment or chronic care respectively. Otherwise the data refer to the hospital as a whole, irrespective of the type of care provided.

APPENDIX A: DATA SOURCES, DETAILS AND GLOSSARY OF TERMS

The details given in this appendix refer to the 223 public general hospitals in operation during 1971 and 1972. Most of the analysis refers to the 205 hospitals on a global budget. The remainder, 18, were on line budgets with line review. Data on six hospitals for 1971 were missing, because they were not in operation that year. The hospitals were selected from the Canadian Hospital Association, Canadian Hospital Directory, 1972. The twelve Red Cross Outposts were collapsed into one unit. Occasionally facilities in the same hospital were separately listed. These too were aggregated. The Ontario, Ministry of Health Hospital Statistics provided guidance on the selection of hospitals and the aggregation of facilities.

I have tried to ensure as far as possible that the correct information is given. I assume that this is so for the Canadian Hospital Directory. The financial data in the forms FC-001, HF-50, and HS-2 are all based on audited accounts and presumably are also correct. The series for which it was most difficult to obtain consistent definitions came from the minutes of Budgets Committee A. The difficulty is partly one of interpretation but also partly because the budget approval process can go through many stages.

A. Data on 1972 budget

Actual expenditure: Taken from Form FC-001. Defined to be the claim made by the hospital for in-patient care provided under the provincial health insurance plan. The claim is of actual expenditures made, prior to any calculations for activity adjustment and incentive awards or penalties.

Unadjusted approved budget: Taken from Form FC-001. Defined to

be the allowable budget for in-patient care. It includes all amendments to the original budget approval except for in-patient activity adjustment.

Assets: Taken from Form HS-2, page 12, line 21 and page 13, line 10, both column 4. Refers respectively to 'current assets', and 'assets for capital purposes', both on Integrated Fund. Data available for all but five hospitals.

Contributed services: Taken from Form HS-2, page 10, line 6, column 2. Data were available for all but five of the 205 hospitals on a global budget, and missing for one of the 18 on a line budget.

Differential charges: Taken from Form HS-2, page 8, line 15, column 2. Refers to income from private and semi-private accommodation, half of which was available to the hospital for its own use until 1974. Data were available for all but five of the 205 hospitals on a global budget, and missing for one of the 18 on a line budget.

Donations: Taken from Form HS-2, page 10, line 5, column 2. A non-deductible source of income for the hospital. Data were available for all but five of the 205 hospitals on a global budget, and missing for one of the 18 on a line budget.

Exceptional salary increases: Taken from the minutes of the budget settlement, Budgets Committee A.

(Final) settlement: Taken from Form FC-001. Defined to be the payment made to the hospital to cover its approved in-patient costs. Settlement is determined after activity adjustment and includes any incentive award made.

Global increase: Taken from Form A-1, line 30. Also available from the minutes of Budgets Committee A.

Global line budgeting: Information on the degree of disaggregation was taken from the minutes of Budgets Committee A.

Incentive award, capital: Taken from the minutes of the budget settlement, Budgets Committee A.

Incentive award, continuous: Taken from Form A-1, line 49. Also available from the minutes of Budgets Committee A. Neither source is complete, but most hospitals with an award should have been covered. However, the value of the award only refers to the year in question.

Incentive award, one-time: Taken from Form FC-001.

In-patient activity adjustment: Taken from the minutes of the budget settlement, Budgets Committee A.

Investment income: Taken from Form HS-2, page 10, line 7, column 2. A non-deductible source of income for the hospital. Data were available for all but five of the 205 hospitals on a global budget, and missing for one of the 18 hospitals on a line budget.

Liabilities: Taken from Form HS-2, page 15, lines 9, 10 and 11, column 3. Refers respectively to 'long term', 'capital short-term', and 'current' liabilities on Integrated Fund. Data available for all but five hospitals.

New programs: Taken from the minutes of the budget settlement, Budgets Committee A. This is more or less a residual item; that is, the sum of all lines for hospitals on a global budget, but excluding unemployment insurance, education, home dialysis, home alimentation, laundry, and ambulance services. The annualization of new programs introduced during the preceding year is included, and taken from Form A-1, line 27, column 3.

Out-patient services, income from insured: Taken from Ontario, Ministry of Health Hospital Statistics, 1972, Table 21.

Surplus/deficit with Ministry: Taken from Form FC-001, and occasionally from the minutes of the budget settlement. Refers to the hospital's favourable/unfavourable variance of its actual over approved adjusted (adjusted for a change in in-patient activity)

expenditure. The variance determines whether the hospital is eligible for an award or must pay for overexpenditure.

Unemployment insurance: Taken from the minutes of the budget settlement, Budgets Committee A.

B. Data on 1972 and 1972 budgets

Bad debt net provision: Taken from Form HF-50, lines 18 and 19, column 2.

Gross allowable costs: Taken from Form HF-50, line 5, column 2. Defined to refer to the cost of all activities that would be covered by the health insurance plan, whether or not actually paid from this source.

Gross allowable costs adjusted: Defined as gross allowable costs (+), bad debt net provision (-) other deductible income (-), and unapproved expenses. Intended to be a measure of the level of 'approved' activities in the hospital, without distinction of in- or out-patient care or research. Referred to in chapter 2 and subsequently as 'unadjusted final approved budget' (hospital's total income).

Other deductible income: Taken from Form HF-50, lines 7, and 9-14, column 2. This is hospital income for a variety of activities not specifically related to hospital care. It mainly includes revenue from its cafeteria, and might have included income from operating an ambulance service.

Unapproved expenses: Taken from Form HF-50, line 15, column 2. These are expenses for activities that are not included in the health insurance plan.

C. Non-financial data

Accreditation: Taken from Canadian Hospital Association Canadian Hospital Director, 1972. Refers to accreditation with Canadian Council on Hospital Accreditation.

Bed surplus/deficit: Unpublished for 1972. Information was provided by Information Systems Division, Ministry of Health, Defined on a 'hospital centre' basis and on catchment areas as defined by hospital use. The details of status for the hospital centre are assigned to each member hospital. In 1972, the bed guidelines to identify surplus/ deficit per 1,000 population became:

Active	4.0/1000	population (South)
	4.5/1000	population (North)
Chronic	11.9/1000	population aged 65 and over
Psychiatric (Acute)	0.4/1000	population
Psychiatric (Long Term)	0.7/1000	population
Special Rehabilitation	0.1/1000	population
General Rehabilitation	0.15/1000	population
Nursing Home Care	3.5/1000	population

Beds: Taken from Ontario, Ministry of Health, Hospital Statistics, annual. Distinction made since 1973 between rated bed capacity and staffed beds. The former refers to beds permitted according to the guidelines based on floor space. The use of staffed beds recognises that some bed and budget cuts have been implemented.

Case flow rate (CFR): Alternatively defined as the number of patients under care per bed per year, or as $3.65 \times \frac{OCC}{LOS}$.

Date of foundation: Taken from Canadian Hospital Association, Canadian Hospital Directory, 1972.

Medical staff: Provided by the Data Development and Evaluation Branch, the Ministry of Health. Refers to a number of active medical staff in 1972-73, defined to consist of those medical practitioners who have been appointed by the Board of Trustees to be members of the active staff and to be responsible for ensuring that medical care is provided to all patients in the hospital. Data were provided on all but 26 of the 223 hospitals studied. Those for which data had not been collected were long-stay hospitals where the issue of hospital admitting privileges is hardly relevant.

Group: Taken from Ontario, Ministry of Health, Hospital Statistics, annual. Classifies hospital by teaching status, type of care provided, and size.

Length of stay (LOS): Taken from Ontario, Ministry of Health, Hospital Statistics, annual. Defined as the number of days of patient care divided by the number of patients under care.

Occupancy rate (OCC): Taken from Ontario, Ministry of Health, Hospital Statistics, annual. Defined as the number of days of patient care as a percentage of staffed bed days.

Ownership: Taken from Canadian Hospital Association, Canadian Hospital Directory, 1972. Ownership could be lay, religious, municipal, etc.

Region: Ministry of Health internal document.

Riding: This information was derived by the use of electoral maps, telephone directories, and Ontario, Ministry of Treasury, Economics and Intergovernmental Affairs, Municipal Directory. Refers to the provincial results for 1971.

APPENDIX B: INDIVIDUALS INTERVIEWED

Ministry of Health

Mr. S.G. Blair
Miss E.M. Calder
Mr. F.W. Carvel
Mr. J.P. Chapin
Mr. E.W. Clark
Mr. O.H. Clusiau
Mr. C.W. Davies
Mr. S. Dreezer
Mr. J.D. Hudson
Mr. D. Levy
Miss D. Monteith
Mr. Ken Owen
Mr. Ron Quan
Mr. D.C. Robson
Mr. M.J. Shaw
Mr. N.I. Smith
Mrs. M. Valliant
Mr. R. Verbrugge
Mr. D.A. Wood

Ontario Hospital Association

Mr. John Davies
Mr. John R. Haslehurst
Mr. E.H. Riley
Mr. Peter Wood

Ontario Hospitals

B.R. Fletter, Kingston General Hospital, Ontario
W.L. Lough, Toronto General Hospital, Toronto
E.W. Roeder, York County Hospital, Newmarket

Others

Mr. D. Berkowitz, Connecticut Hospital Association
Dr. R. Fink, Health Insurance Plan of Greater New York
Mr. C.M. Sedlack, Blue Cross of Western Pennsylvania

Ministry of Health

Mr. W.A. Backley
Dr. W.F. Lumsden
Mr. R. Oss
Mr. R.H. Reid
Mr. R.L. Waterhouse
Mr. F.X. Whorms

Ontario Council of Health

Mr. S.W. Martin

Ontario Hospital Association

Mr. T. Lynch
Miss J. Moran
Mr. G. Reid

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